THE
WEALTH OF INDIA.

A Monthly Magazine of Practical Information and Useful Discussions

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The Wealth of India.

The object of this Monthly is to publish the views of experts on the various problems bearing on material progress, specially agriculture, commerce, industry, economics, co-operation, banking, insurance, popular, scientific and technical education, to digest the notable articles appearing in the leading magazines and periodicals and generally to serve as a record of practical information, and useful discussions. It is believed such a publication is indispensable to statesman, publicists, businessmen, students of economics and all others interested in the material and moral advancement of the country.

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Current Topics

BY ECONOMICUS.

Cotton Cultivation.

It is now an admitted fact that the efforts made by the Agricultural departments to expand and improve the agricultural industry in this country have not borne much fruit. The poverty and ignorance of the cultivators prevent the adoption, by the common ryot, of scientific and improved methods of agriculture which have revolutionized the condition of the industry in progressive countries. The Indian cultivator does not understand the advantage of improved methods, and if he does so, has not the means to follow them. Ever at the mercy of the money lender, the small impecunious tiller of the soil, can barely eke out a miserable subsistence. The agriculturists cannot organize or combine themselves for common benefit, and the results of the agricultural improvement movement are anything but encouraging. The departments are, however, doing what they can, under the circumstances, by means of demonstrations, exhibitions, and so forth, to bring home to the cultivator the value of improved methods and processes in agriculture. The report for the year 1911-12 on the progress of Agriculture in India issued by Mr. Bernard Coventry, Agricultural Adviser to the Government of India, gives a fair idea of the work that is being done in the different provinces in the direction of agricultural expansion and improvement. Commercial crops like cotton, sugar-cane and

wheat have been engaging the special attention of the Imperial Department of Agriculture. With regard to cotton, we note that in Bombay approximately 20,000 acres have been sown with improved cottons with the seed of which it is expected ultimately to influence some 2,000,000 acres. This Presidency has recently witnessed remarkable strides made by the cultivation of improved varieties of cotton with the result that the cotton trade of Madras has been greatly improved. The increase of the area of cotton in this Presidency during the past two years amounted to 600,000 acres and the crop of the Cambodia variety is estimated this year at 80,000 bales of the value of 150 lakhs of rupees as compared with 33,000 bales in the previous year. The other provinces also share this expansion though to a smaller degree. It is interesting to note that in the opinion of Mr. Coventry, 'the problem of cotton cultivation in this country is not altogether bound up in its quality or in increasing the length of its staple' because it is generally found that increased yield and increased ginning percentage combined with hardiness of habit in the plant means more money for the cultivator than mere length of staple. It is indeed a truism that the mere quality of cotton, taken apart from the yield, is not a true indication as to whether cotton cultivation is doing well or not. But when there is clear evidence to show that on the whole the cotton now grown is inferior in quality to that of many years ago, we do not know why the question of improving the quality should not be seriously tackled along with that of extending the area of cultivation. True, there are many difficulties in the way and the cotton of the improved variety does not command as ready a sale as the ordinary cotton. But recently Bombay has been importing a considerable quantity of American cotton, which shows that a higher quality of cotton produced in India ought to be locally taken up. Attention must therefore be devoted to the turning out of superior qualities of cotton which are bound to fetch high prices. Mr. Coventry is, however, inclined to consider the yield as the chief factor and to relegate quality to a subordinate position and looking at the matter from this point of view, he thinks that there is every cause for satisfaction.

Indigenous Sugar Industry.

Whenever the question of rehabiliating the indigenous sugar industry has come up before the Viceregal Council or outside it, it has been pointed out that the industry cannot be revived and sustained only on the strength of a protective import duty imposed upon foreign sugars. 'The fundamental problem in the saving of the Indian Sugar Industry' Mr. Coventry observes, 'lies in better cultivation and the introduction of canes possessing a larger percentage of sugar and higher purity of juice.' The quality of the canes from which sugar is ordinarily manufactured in this country is very low, and unless it is materially raised, it is not possible to adopt modern methods in sugar manufacture with any measure of success. How low is the sugar content of Indian canes may be seen from the fact that while in India at the present day, it takes some fifteen to sixteen maunds of cane to make a maund of sugar, in other countries the same quantity of sugar can be made from ten maunds of cane. From this it is easy to understand the very great importance which the breeding of canes has in the problem before us. Conscious of this, the Board of Agriculture in India recommended the establishment of an acclimatisation and cane-breeding station in Madras. The recommendation has been adopted and Dr. C. A. Barber is to be in charge of the station in Madras for a term of five years. The sugar expert has not only made a collection of the important canes of India, but has already raised a very large number of new seedlings which will this year be available for experiment in the sugar tracts. The other aspect of the problem is the mechanical one and is receiving proper attention. For this purpose, Mr. William Holme has been appointed Sugar Engineer for a period of three years. 'His attention will be directed mainly to studying methods of manufacture and to

determining the improvements that are required on the mechanical side.' He is, this year, conducting a trial in Pilibhit in the United Provinces with a factory fitted with modern machinery and capable of crushing 100 tons of cane per day of 24 hours. Sugar-cane stations will be established also in Behar and the United Provinces. It is to be seen to what extent the indigenous sugar industry benefits by these earnest efforts to revive it. Besides cane sugar, sugar produced from the palm is said to have a very bright future before it in this country. Very few people know that nearly half a million tons of sugar are produced yearly from the palm in India and Mr. Annet's work on this subject has indicated the possibility of there being a considerable future for this industry in improved methods of cultivation and of treatment of the juice. It is superfluous to add that the need of taking immediate and effective measures to place the Indian sugar industry on a satisfactory basis, is most urgent. While our country is one of the largest cane-producing countries in the world, far from exporting large quantities of this article to foreign countries, it actually imports more than twelve crores worth of fine sugar from Java, Mauritius and Austria-Hungary every year. This state of things is hardly creditable either to the Government or the people and we are glad the attention of both has been seriously attracted to the subject.

Aid to Economic Development

The plea Mr. Coventry puts in in favour of more liberal pecuniary assistance from the State to the economic development of the country, is most reasonable and opportune. It is notorious that education in India is too literary, that the liberal professions have been already over-crowded by the products of the Universities and that excepting these and State service there are no openings left for our educated young men. At the same time, the resources of the country have yet to be developed so as to lead to an increased production of national wealth. Mr. Coventry observes :—'With the spread of education, to which a stimulus is now being applied, and the desire which exists of improving the condition of the people, corresponding assistance seems to be called for in the sphere of economic development.' Unless this is given, he is afraid a condition of affairs will be created wherein the better educated will not have suitable material to which to devote their minds, and there will result the anomalous spectacle of a highly educated people in an undeveloped country. We are not sure that he correctly represents the situation when he says that already political issues and the problems of education are drawing the minds of the educated and ruling classes away from thinking of economic schemes, to those of purely theoretical merit. These political and other issues to which Mr. Coventry refers as detrimental to the cause of economic progress, are really calculated surely though indirectly to assist this progress. The public has been sufficiently alive to the extreme urgency of promoting economic advancement and cannot be charged with frittering away its energy in supporting movements of doubtful value. It is a very comprehensive problem and Government ought to make up its mind to tackle it in a systematic manner and a generous spirit. Mr. Coventry suggests that in order to secure uninterrupted progress in economic development, a fund should be created in India on the lines of the English Development and Road Improvement Funds, which have for their objects the aiding and developing of agriculture and rural industries by means of research, instruction and experiment, the organization of co-operation, and in general, the promotion of the economic development of the United Kingdom. The creation of such a fund in India, Mr. Coventry thinks, would be an inestimable boon and a fitting compliment to the policy of reform and education already in hand. The scope of the proposed fund is too indefinite and extensive for the idea to be regarded as practicable. The economic development of the country does need liberal support at the hands of Government ; but how that is to be extended so as to assist the

people actually concerned, that is the difficult question.

The proposed State Bank.

In noticing the proposal about a State Bank for India which emanated from the London *Times*, we have pointed out how it does not offer any practical advantage over the present system. It is true that the Provincial Banks are inadequately capitalized and their scope of operations is restricted by law. They do not therefore stand to the State in India as does the Bank of England to the British Government. But in suggesting that the Provincial banks should be amalgamated so as to form one all-India bank the vastness of the country and its population must not be lost sight of. The proposed State Bank may administer the Presidency banks and their branches, but can it do the treasury work for all India and in the hundreds of out-of-the-way places where treasuries are, and must be kept upon a commercial basis? Then it is feared that a State Bank cannot conduct the internal and external banking affairs of India without competing on such unfair terms with all the existing exchange and local joint stock banks as to consign them to the grave. The writer in the *Times* contends that there will be no such competition and that the joint-stock and other banks will receive substantial support from the central bank. This is, however, doubted by many who hold that, in this respect, the State Bank would create a trust of the most ruinous kind possible for India. The advocates of an all-India bank are mistaken if they suppose that it will work miracles and will be able, for instance, to charm the savings out of the pockets of the millions of small holders of the precious metals in India. If it does not do this, how is the State Bank to secure more than the normal increase over the present Presidency banks' deposits? If the State Bank is, again, expected to restrain the flow of gold into India which has been causing anxiety to the minds of London banks, it will do nothing of the kind. As a writer on this subject remarks, 'India will continue to mop up as much gold as she can get, andhaving got it, no State Bank will induce her to part with it.' He also doubts the capacity of a central bank to eliminate the sharp seasonal divergence between discount rates in India unless it could attain command of the seasons, and says :—"Imagine Burma rice, Bengal jute and tea, Bombay cotton, Punjab wheat, and all other crops of India just maturing at such time and in such bulk as to suit the financial situation!" Indeed the currency department in the hands of a State Bank will expand the paper currency in a manner which under purely official management has not been accomplished to the satisfaction of certain critics. But will the bank be able to achieve any thing besides this?

High prices in India.

It may be remembered that Mr. K. L. Dutta of the Finance department had been deputed by the Government of India to inquire into the causes of the high prices which have been prevalent in India for some years past. He has now finished the inquiry and submitted his report which is being considered by Government. Everybody is anxious to know what theory Mr. Dutta has formulated as a result of his investigation with regard to the rise of prices. He was asked by a press representative, the other day, to communicate the conclusions he had arrived at, but he was naturally reticent in the matter and we must hold our souls in patience till the report is published. From what he said, however, we catch something of the views he seems to have formed. Among the causes to which the rise of prices has been attributed, the chief are the failure of the outturn of food-grains in India to keep pace with the demand, the large exports of these to foreign countries when they are wanted at home, the currency policy of Government which has filled the country with huge quantities of token coins and the facilities of transport and the improvement in the standard of living. Mr. Dutta seems to hold that the substitution of commercial crops like cotton for food-grains has little to do with the high prices as the substitution can have occurred only over a very small area. Nor have the exports of food-grains brought about the

rise which is mostly due to the fact that on account of the steamer, the telegraph and the railway, India has been brought into close touch with foreign countries and prices all over the world tend to approximate. The abundance of food-grains in any part of India does no longer cheapen prices there. We have one world market and one world price and even the Indian cultivator knows now the advantage to be reaped from a higher price level in other places or countries. This is no doubt an important factor in the situation and does indirectly refer to the production and export of food-grains. Of all the provinces in India the rise of prices has been the smallest in Madras. Why so? Apparently because this Presidency has been singularly free from the periodical failures of rain which occur in the other provinces. This at once leads us to believe that droughts, mortality among cattle and failure of crops have had much to do with prices. How far they have been affected bythe currency policy of the Indian Government Mr. Dutta did not say. But he apparently endorses the view expressed some time ago by our retiring Finance Member that "India by its adoption of a gold standard has been switched on to the currency guage of the rest of the world; and is undoubtedly bearing its share in the price fluctuations to which the rest of the world has been subject." The public will keenly await the publication of Mr. Dutta's report.

Commercial Interests of Calcutta.

The commercial interests in the capital of India that was, have not yet got over the shock dealt to them by the transfer of the seat of the Government of India to Delhi. From time to time they have been making an exhibition of their irritable temper and the Commerce Member has come in for a good deal of not very pleasant experience in this connection. The Calcutta merchants cannot get away from the fact that, do what they might, the supreme Government cannot be recalled to their city. The next best, of course, is that Delhi should be only an ornamental, a ceremonial capital, and the real seat of administration and authority should be Simla where the Members and Secretaries of the various departments should spend the major portion of the year. Calcutta would be nearer to and more in touch with the Himalayan seat of authority than the historical city in the plains. Bombay, Karachi and Madras do sympathise with the misfortune of Calcutta but do not agree in condemning the change of capital. The interests of merchants on the Hughli are obviously at variance with those of the other commercial centres and this conflict has manifested itself on many occasions. Bombay plumes herself upon being the first city in India and the second in the Empire and the claim is disputed by her rival in Bengal. Population figures are often manipulated by the disputants to fit in with their theories. While the two cities are thus contending for the honour of the first place, Karachi is steadily growing in importance and seriously threatening to rival the greatness of Bombay. While Bombay may boast of her large imports of gold, Calcutta boasts for in the volume of the imports and exports of merchandise as trade figures for the last year testify. In the matter of the currency system and the financial management of the India Office, the two cities do not see eye to eye with each other. Bombay wants a gold currency and a gold mint for India; Calcutta is opposed to the proposal. Bombay strongly condemns the financial methods of the India Office; Calcutta is indifferent in the matter. Bombay has two representatives on the Finance Commission; Calcutta has none. Thus the rivalry and divergence of view of the European merchants of the two principal industrial and trade centres of India reveal themselves from time to time as they express their opinions on the several problems of the day. The Hon'ble Mr. Clarke is doing his best to modify the wrath of the Calcutta merchants by conferring with them and making concessions to them. Arrangements are being contemplated, designed to keep the Commerce and Industry Department at Delhi in close touch with commercial opinion in Calcutta and Bombay. This object will be attained by the Commerce

Member touring frequently to the commercia centres so as to ascertain from merchants there their views on important questions. It is also proposed to have two Directors of commercial intelligence, one at Bombay and the other at Calcutta. The disadvantage of the isolation and backwardness of Delhi can be overcome only by some such means and commercial Calcutta ought to be satisfied with any reasonable arrangements that may be made in this behalf.

Bombay College of Commer.e

Whatever may be said about the comparative Commercial importance of Bombay and Calcutta, the 'Gate-way of India,' has, at least in one matter, gone ahead of the 'city of palaces.' The Bombay College of Commerce which is being talked about for some time past, soon promises to be an accomplished fact. Thanks to the public spirit and generosity of certain private donors and the commercial bodies, the Government of Bombay is now in a position to announce that the Secretary of State has approved of the proposals submitted to him and that the College of Commerce will, in a short time, come into being The Secretary of State has sanctioned the scheme as well calculated to meet the demand which may be expected to make itself felt in India for the services of trained actuaries and auditors, more3 especialy in view of the recent legistation controlling Life Assurance Companies and Provident Societies. The teaching staff which it is proposed to engage for the College at its commencement, will consist of a Principal on Rs. 1,125 per mensem, a Professor on Rs. 875 per mensem and two lecturers on Rs. 300-500 per mensem each. The two Professors will, of course, be recruited in England for a specific term of service and the two lectureships will be held by qualified Indians. The College will be entirely under the control of Government, but in order to maintain the courses of study in full harmony with the practical requirements of commerce and industry, an advisory board will be appointed consisting of thirteen members representing Government, the private donors and the commercial bodies which have promised to contribute towards the cost of the College. The college will be affiliated to the University of Bombay, which has instituted a new degree of Bachelor of Commerce and framed a scheme of studies in connection therewith. The importance of having well-equipped colleges of Commerce in commercial centres in India cannot be overestimated. At the present moment the work of imparting instrutction in commercial theory and practice is being done in Bombay by a number of private classes and institutions, and students from Madras and other distant places are seen taking advantage of the facilities thus provided. There is ample demand in India for trained accountants and actuaries and it is bound to grow for some time. Training in practical business, in methods of banking, insurance and so on, is also very essential to the economic and industrial progress of the country. We are afraid, however, that as in the matter of technical education, so in that of commercial education, the supply of trained men will have to be adjusted to the demand. Mr. W. A. Lee, President of the Advisory Board of the Commercial Institute in Calcutta, is reported to have observed to a press representative as follows in this respect :—" You can not create a commercial class by means of commercial classes. There must be a commercial demand behind them. I do not say that there is room even in Bombay for a college of this sort, but I have no hesitation in saying that there is more room in Bombay than there is in Calcutta " He proceeds to say that the great commercial houses in Calcutta are run by Europeans and the superior positions are all held by men who are imported from Europe at great expense and with regard to whom the mere possession of a commercial diploma is a secondary consideration. And as regards the inferior posts it is not worthwhile filling them with diploma holders. Mr. Lee thinks that in Bombay there is unquestionably a much wider field for locally certificated men in the higher walks of commercial life. It is the urgent need of the moment, and ought to be the ambition

of educated Indians that they should be able to control the commerce and industries of their own country. Commercial education ought to fit them for responsible positions in commercial life and ought not to make only clerks and subordinates of our young men. This, of course, depends upon the aptitude they show for commercial life, their honesty, and mutual trust. At any rate, adequate provision made for commercial education must go some way in assisting in the economic progress of the country.

Labour in India.

The Indian people are often advised to be on their guard against some of the serious evils which are sure to come to prevail in the country in the wake of the modern industrialism which is slowly and silently, nevertheless surely, establishing itself in this ancient land. The country is, however, too vast and the population, too large and backward to be easily and perceptibly affected by the introduction of Western ideas and methods with regard to capital and labour. Western economic and industrial developments are confined to-day to a few commercial centres and they have not yet touched more than the fringe of Indian society. Railways and trams, mills and factories, mines and plantations employ large armies of labourers together and from time to time we witness there a conflict between the employers and the men. Indian labour is not, however, organised and intelligent and cannot therefore imitate, to any great extent, the example of workmen in the West, either in the fraternal or the militant aspect. The little misunderstandings that sometimes occur on railways and in factories remind us of the possibilities, and the big strikes that either take place or are threatened on the railways, where the men are better organised, indicate in what direction things are moving in this country. The spread of education among the masses, the diffusion of socialistic ideas among the working classes, the reduction of the workmen to the condition of a machine under the modern methods of manufacture, the accumulation of wealth in a few hands—these and similar other causes have created a feeling of discontent in the mind of the lower classes generally in western countries. In India, the spread of education, the facilities of communication provided by railway and telegraph, and the prevailing high prices are tending in the same direction. The Indian labourer is no longer a contented being taking his lot as inevitable. If he migrates to the larger cities, or gets employed on railways, canals and other public works, he has the tempting prospect of considerably high wages. Both skilled and unskilled labour is at present, in great demand and the wages are being proportionately forced up. Even the agricultural industry is being markedly affected by the rise of wages, though it is not as pronounced as the rise in the remuneration of the urban workmen. From the report on the wage census taken by the Government of Bombay in 1911, the results of which were recently published, we find that there is a general complaint as to a rise of at least 25 per cent. in the rate of wages during the last five years. The rise is attributed to plague and the higher price of food stuffs. Society in India is gradually passing from a position of status to that of contract. The empire of custom is giving way. The unskilled labourer is reported to be more independent owing to the ready demand for his services, and less amenable to control. The number of hours worked has decreased and labourers are said to be very unpunctual. It is an unfortunate feature of the situation that while the remuneration of labour has increased, though not perhaps everywhere in proportion to the rise in prices, the quality of the work done by artisans and by farm labourers from whom skill is required, is stated to be much inferior to what it was ten years ago. Similarly a deterioration in the cultivation of land is reported to have resulted. This is a state of things which is probably common to all ports of the country and one on which it cannot be congratulated. It will be very useful if all Provincial Governments were to decide to take a periodical wage

census as the Government of Bombay has done, to compare the rate of wages from time to time so as to guage the improvement or deterioration in the condition of the labouring population. The idea of taking a wage census originated, we are told, in the United Provinces. The main object of the Bombay scheme was to "ascertain the standard rates of wages in each district or homogeneous tract and to provide material for the observation of permanent changes in these standard rates, neglecting short period fluctuations." Of course, a uniformity in the rates is not to be expected, though it is most convenient as was done in the Bombay census, to divide the rates into urban and rural. The other Provincial Governments will do well to follow the lead of the United Provinces and Bombay in the matter of the census. The problem of Indian labour will tend to become more serious as the years pass by. Labour may be cheap in this country but taken in conjunction with its inefficiency it is practically very dear as employers find to their cost. It is also becoming more independent. With the spread of education workmen are sure to organize themselves for common benefit and support. The problem, therefore merits the careful attention of Government and educated people generally.

Special Articles.

INDIAN INDUSTRIAL PROSPECTS.

BY DIWAN BAHADUR K. KRISHNASWAMI RAO, C.I.E.

HINDUISM is often accused of being an obstacle in the way of the material prosperity of India. Is it really so ? The Shastras has made it compulsory on the Vysias and Sudras to pursue commerce, arts and industries as a matter of religious duty. Brahmins alone are under the religious obligation of leading a purely spiritual life. They are such a small fraction of the Indian population that their strictest adherence to the Shastraic injunctions could not tell upon the industries of India. It is doubtful whether these injunctions were at any time fully obeyed; but now owing to the greatly altered circumstances, they are honored more in their breach than in their observance. Brahmins have begun to adopt freely almost all the professions. The number of those that go to foreign countries where arts and industries flourish, is increasing. The fact that those Indians who have returned to India after undergoing a good technical course in foreign countries, find no adequate employment, conclusively proves that it is not the Hindu religion but something else that stands in the way of our material progress. Such of the Indian arts and industries as have survived the fierce onslaught of foreign competition, owe their existence, very largely to the Hindu religion, usages and customs. The rituals and festivals in Hindu temples, the ceremonies such as *Oopanayanam* marriage, funerals, anniversaries, and the charitable works such as the construction of places of worship, rest-houses, stimulate commerce arts and industries to a considerable extent. A large number of architects, carpenters, ironsmiths, sculptors and unskilled laborers, find work in the building of new temples and in the renovation of old ones. Decorations of sacred images and the fashions of Hindu ladies give employment to many jewellers, weavers, and workers and dealers in lace, silk, silver, gold, precious stones, flowers and perfumes.

processions of Hindu deities as well as the processions on marriage and other festive occasions, require the services of musicians, trumpeters and pyrotechnists. Even the caste marks worn by the different classes of Hindus enable a small number of people to earn their livelihood by the preparation and sale of the necessary articles.

Judging from the fact that even Mr. Krishnamoorthe of Theosophical fame, who is to develop into an Avatar, is receiving a high university education and training in Europe, from the general tendency of the times to discount everything Indian, and also from the great changes which the Western civilization and culture are introducing among us, the future of such of our industries as are struggling for existence, appears to be gloomy. Locally manufactured lac bangles are becoming scarce owing to the increasing use of the imported glass bangles. Flowers made of paper and other material imported into India, have just begun to take the place of natural flowers in decorations. Indian perfumes are making way for European scents. European refreshments are fast driving out Indian refreshments. The advancing changes in the costumes of the educated young men against which the renowned great friend of India, Rev. Dr. Miller, has strongly protested, are diminishing the demand for local manufactures.

The growing popularity of foreign substitutes for Indian articles is not altogether irrational. Some of the former are superior to the latter in point of comfort, convenience and elegance. The only complaint against them is that the increasing preference given to them will curtail the little scope which the Indian arts and industries now possess. Under the present conditions, how should the place of dead industries and arts be supplied, and can anything be done to impart vitality to the decaying industries and arts and to arrest the growing poverty of India under the pressure of foreign competition, are the most pressing and perplexing problems for the serious consideration of Indian thinkers as well as of the well-wishers of this land.

Five years ago, Bengal strongly agitated for preference to Indian manufactures and her example was followed by the rest of this peninsula. The movement which was then known as the "Swadeshi Movement," promised to lift up India to a high place in the world of industries. The demonstrations then made ; the zeal, earnestness and enthusiasm then displayed, created the belief that the era of material prosperty had dawned on India. Everywhere, there was loud talk about the use of "swadeshi" articles and in some places, vigorous steps were taken to revive and improve local arts and industries and to introduce new ones. The movement affected even the Governments, Imperial and Provincial, in India. We had an Industrial conference at Ootacamund under the auspices of the local Government, composed of eminent officials and non-officials, presided over by the then Governor of Madras (Sir Arthur Lawley). The resolutions passed by the conference left nothing to be desired. Nothing substantial has yet been done to give effect to them. The scholarships for technical education and training in Europe, sanctioned by the Government of India, are so *very few* that they can hardly be said to be in existence. The greatest want of India is a first rate Polytechnic College. The Government of India have not yet bestowed their serious thought upon it. So far as the public are concerned, the "Swadeshi" Movement may be said to have met with premature death. An Insurance Company in Bombay has resolved to drop the word "Swadeshi" from its name. This fact clearly proves that this word which 3 years ago, was a great charm, has now lost all its attractions. Exhibitions which used to be held along with the annual All-India Industrial Conference, are among the things of the past. It is however some consolation that the speech-making portion of the conference still continues to be an annual function. Of late, the State of Mysore has organized a standing industrial conference

and seems to be anxious to do something substantial in the way of improving local industries. The present Dewan is taking great interest in the work of the conference. India is anxiously waiting to see the result of the most laudable step taken in Mysore. The boons announced by His Highness the Rajah of Pudukottah during the celebration of the Silver jubilee of his reign, indicate that this small State has begun to realize the importance of technical education as a factor for its material progress. The Cochin State has recently founded some technical scholarships as Travancore did at one time. These are no doubt happy signs of the various Governments feeling their responsibility for the material advancement of the dominions under their control. But there is a deplorable drawback in Native States, which requires serious consideration. Measures introduced by one administration do not as a rule, receive the support of the succeeding administration. It may be hoped that the constitutional changes that are being introduced in Native States, may secure a continuity of policy. One of the objects of the proposed Hindu and Mahomedan Universities is said to be to make due provision for technical and scientific education. It is the sincere prayer of every patriotic Indian that God may be graciously pleased to bless the noble work of our illustrious countrymen in the north who are sparing no pains and expense to establish these universities. We cannot have a more convincing proof of our miserable lack of scientific and technical knowledge than the most wretched condition of the Madras Glass Works which, even with the liberal concession granted by the Madras Government in the matter of fuel, is not able to work.

Technical and Scientific knowledge and training are only preliminary requisites. They are not *per se* sufficient to secure complete success in any industrial concern. The few that have qualified themselves for scientific and technical work by a course of study in foreign countries, have not found employment worth speaking of. This is chiefly due to the paucity of industrial concerns which require their services. The only business which freely attracts Indian capital at present is the banking, because it begins to pay dividends almost from the start. In all industrial concerns, the first 3 or 4 years must necessarily be barren of profits, as the preliminaries such as the construction of buildings, the purchase and the fitting up of machinery and the collection and preparation of raw materials, take time. The Indian capitalist, as a rule, does not possess the amount of patience which the unavoidable delay in starting work in any new industry, demands. Even in the working stage, the Indian concerns have to contend against the foreign imports, which are the products of master manufacturers of Europe and America who are in advance of us by one century of inventive genius, skilful workmanship and daily improving mechanical appliances. Moreover capital cannot be had in India on the easy terms on which it is obtainable in European countries. Under these unfavourable conditions, the Indian industrial concerns cannot be expected to work with profit unless they are actively supported by the State. The phenomenal success of the Co-operative Movement in India, affords the best proof of what even the least patronage of Government could do in any concern. Travancore deserves honorable mention for the encouragement she has given to the South Indian Match Manufacturing Company, by liberal concessions. Native rulers can do much to help the cause of Indian Industrial Progress. In the present condition of India, no important industry can have a chance of success so long as the British and Native Governments are indifferent to it.

Neither the scientific and technical knowledge nor the state patronage will be able to secure fully the desired object, unless the Indians acquire the European characteristic of sturdy determination to achieve success in spite of all obstacles. The moral contained in the following Sloka of Sree Barthru Hari (one of the greatest sages of India) ought to be

borne in mind by all workers in this country :—

" ప్రారభ్యతే నఖలు విఘ్నభయేన నీచైః ।
ప్రారభ్య విఘ్ననిహతా విరమన్తి మధ్యాః ।
విఘ్నైర్ముహుర్ముహురపి ప్రతిహన్యమానాః ।
ప్రారభ్ధ ముత్తమగుణాన పరిత్యజన్తి ॥ "

Men of low type never begin a work for fear of failure; men of middle type abandon the work begun by them when they are confronted with obstacles ; but men of highest type continue the work undertaken by them, in spite of *repeated* failures and achieve success.

THE COCOANUT.

By A. Ghosh.

INTRODUCTION.

India is the home of palms among which cocoanut palm enjoys the foremost position. All her maritime provinces abound in these trees, from which she gets a good annual return. Look at the export tables of provincial Sea-borne Trade Statements and you will understand what a large profit India makes annually in exporting cocoanuts and its products to different parts of the world. There you will find that the export trade has been steadily increasing to the advantage of the cocoanut grower.

SACREDNESS OF COCOANUTS.

From time immemorial cocoanut has been held in great reverence by the Hindus, so much so that in all auspicious ceremonies cocoanuts play an important part. The reason is not far to find out, if we consider the innumerable uses to which the different parts of the tree are put.

USES OF COCOANUTS.

The cocoanut tree consists of four main parts :—(1) Trunkwood, (2) Leaves, (3) Flower spathe, (4) Nuts. The trunkwood of an old tree gives beams, rafters, posts, &c., for building purposes. Leaves give mats, broomsticks, screens, thatching materials and fuel. Flower spathes yield sweet nourishing juice, palm sugar and fermented liquor known as toddy. Nuts yield (1) husks, from which coir fibres for ropes, matting, carpets, brushes and brooms, &c., are manufactured; (2) Shells which make *hookas* for smoking, oilmen's spoons bowls, cups and rockets ; (3) Kernel—from which are manufactured sweets of different kinds, cooking and toilet oils, copra, medicinal preparations and some by-products such as soap, candles, butter, oilcake and manure.

On analysis it is found that cocoanut kernel is rich in nitrogen and as such makes an excellent food for man. Cocoanut water is a refreshing beverage on a hot summer day and is also good for dyspepsia. No wonder then that a tree having so much usefulness should be considered sacred, so much so that to cut it down amounts to murdering a Brahmin.

SOIL.

Sandy moist soil with some saline substances is best for cocoanut trees. It is on this account that they thrive best in coastal tracts. With adequate supply of water and plant-food by way of manuring from time to time, a bumper harvest may be expected every year.

MANURING.

It would be admitted on all hands that as years roll on, the soil of a plantation gets poorer and poorer and the owner should do well to supply plant-food every year to the soil to make good the annual loss. For this purpose ashes, common salt, tank-silt, refuse matter from cattle-sheds, etc., are excellent. Growing of legumes under the trees is also good. They arrest the free nitrogen of the air which benefits the roots.

GROWING SEEDLINGS AND TRANSPLANTATION.

The soil for growing seedlings should be ploughed in October and thoroughly got rid of weeds. In the same month large well-ripe nuts from healthy trees should be collected. Care must be had that their outer skins are wholly dried. In November the nuts should be buried in rows, one cubit apart, to half their length, little obliquely with the pointed ends downwards. The ground should have a partial shade to protect the nuts from the scorching heat of the midday sun and should be on a gentle slope to allow of easy drainage. The soil should be kept wet every morning to help germination that takes place in a month. In August next the seedlings are 10 months old, when bunches of tender green leaves crown the nuts. About this time the seedlings should be transplanted. In transplanting, seedlings should be delicately handled without doing any leaf - or root-damage.

GROUND FOR PLANTATION.

The ground for plantation should be ploughed and manured in May with cattle-dung, tank silt and common salt. In transplantation it must be borne in mind that what is gained in space is lost in yield. So close plantation is bad. The seedlings should be planted in rows 20 cubits apart or 25 trees to the bigah, to enable them to enjoy sufficient light and air even when they are grown-up trees. Palms are fair growers in a moist soil free from weeds. So the ground should be constantly kept clean and should be close to a tank or *jhil* for easy irrigation when necessary. In three weeks the seedlings accommodate themselves to the new soil. At this time proper fencing and irrigation are essential. Ordinarily plants begin to yield fruits when they are six years old. Fruiting culminates at the age of twelve when the trees bear as many as 80 fruits each. This state lasts for 30 years, should the plantation be properly taken care of. Young plants and grown-up trees should have earth round their basis to the height of one cubit.

COST OF UP-KEEP PER BIGAH.

		RS.		
1.	Rent	6	0	0
2.	Fencing, etc.	6	0	0
3.	Wages of a cooly (when required)	16	0	0
4.	Manuring	8	0	0
	Total...	36	0	0

OUTTURN PER BIGAH OF GOOD PLANTATION.

		RS.		
1.	Fruits 80 × 25 = 2,000 valued at	70	0	0
2.	Leaves 25 × 10 = 250 ..	4	0	0
3.	Legumes (grown by way of manuring). ...	6	0	0
	Total ..	80	0	0

So the *net* profit comes to Rs. 44 which can be increased at least two-fold, should the grower turn his attention to convert the kernel into copra and oil; husk, into coir; and the leaves into broom-sticks. For his information percentages (in weight) of different component parts of a well-ripe dry nut are given below :—

Taking the total weight of a nut to be 100,

Weight of Husk	= 31
,, Milk	= 26
,, Shell	= 13
,, Meat	= 30
Total ..	100

Taking the total weight of meat to be 100,

Weight of oil	= 59
,, moisture	10
,, waste products	31
Total ..	100

The Agricultural World.

Book-keeping for Farmers.

THERE are few agriculturists in India who keep an account of the income from their holdings and calculate whether their farming is being done as a paying business. The same is the case apparently in England also.

Mr. C. S. Orwin, Director of the Institute of Research in Agricultural Economics at Oxford University, in an address delivered recently to the Farmers' Club in Whitehall Rooms, drew attention to the great importance to farmers of book-keeping. In his opinion, one of the greatest needs of the agricultural industry at the present time was a general tightening up of business methods. He believed that the great majority of farmers kept no accounts of any kind, but some system whereby every man would be able to arrive at the cost of production in each department of his business, and thus obtain a correct profit and loss account, must be of value. In more than one continental country the importance of book-keeping was placed so high that the Governments had established Accountants in different parts of the country for the purpose of keeping farmers' books for them.

Tobacco.

The following table shows the leading tobacco producing countries and the quantities produced in each during 1910 :—

	Lbs.
United States ...	1,103,415,000
India ...	450,000,000
Russia	200,773,000
Austria-Hungary ...	184,817,000
Dutch East Indies ...	128,660,000
Japan	91,850,000
Brazil	75,285,000
Germany	63,611,000
Turkey-in-Europe ...	49,177,000
Cuba	46,081,000
Santo Domingo ...	42,000,000
Philippines ...	40,258,000
France	36,446,000
Mexico	34,711,000
Argentina ...	31,000,000
Algeria ...	20,723,000
Belgium	19,474,000
Canada ...	16,513,000
Greece ...	15,840,000
Italy ...	15,552,000
Roumania ...	15,434,000
Bulgaria ...	13,944,000
South Africa ...	13,519,000
Paraguay ...	13,000,000
Porto Rico ...	10,000,000
All others ...	23,913,000
TOTAL ...	2,756,000,000

From the above, it is clear that, barring the United States, India is the largest producer of tobacco in the world.

Recent Investigations at Rothamsted.

Dr. E.J. Russell, Director of the Rothamsted Experiment Station, England, has contributed a very instructive article to the March issue of the *Bulletin of Agricultural Intelligence* giving a general outline of the agricultural experiments carried out at the Rothamsted farm. We gather therefrom that for many years before their death, Lawes and Gilbert devoted their attention exclusively to crop production, and this policy has been adopted by their successors. Investigations at Rothamsted are now restricted to soil and plant nutrition problems, and no attempt is made to deal with such subjects as plant breeding, animal husbandry, etc., for which provision is made elsewhere. A further feature of Rothamsted is that it has no local duties to perform ; the Staff are not called upon to analyse fertilisers or feeding stuffs, to advice, or to conduct demonstration plots of an educational nature.

The limiting factor in crop production in England is commonly the nitrogen supply; it very generally happens that an increased application of a nitrogenous fertiliser leads to increased crop yields. For this reason, fertility problems in this country often resolve themselves into questions of nitrogen supply, and such questions therefore claim a very large share of attention. Of course, the other factors are borne in mind as well, but the key-note to much of the work is the necessity for understanding more fully the nitrogen cycle in the soil with a view of ultimately controlling the changes that take place, reducing the losses and increasing the production of ammonia or of nitrates.

The second line of investigation has to do with the possibility of the stimulation of plant growth as apart from plant nutrition. Is it possible to find substances which are not themselves nutrients but which will stimulate the plant to greater activity in assimilating the nutrients from the soil or in those photosynthetical processes that enable it to utilise the carbon dioxide of the atmosphere? This work is complicated by the difficulty of finding an exact definition for a nutrient on the one hand, and eliminating secondary effects on the other.

Lastly, investigations are being started on the influence of soil conditions (manures, etc), on the composition of the crop. In England, considerations of quality of the crop play a very prominent part; the feeding qualities of root and hay crops, the malting quality of barley, the baking quality of wheat being all matters of importance in determining the prices. Usually the ordinary analytical processes afford but little guidance to the chemist, and quality depends as a rule on some factors that have hitherto escaped attention. As a first step in these investigations, it has become necessary to ascertain more closely what substances are present in the crop and to what variations they are liable with change of conditions. This aspect of the work is being developed exhaustively, as it must form the basis of any true elucidation of the rather vague characters summed up in the word, quality.

No bulletins are issued from Rothamsted. The scientific papers dealing with Soil Fertility in any of its aspects, chemical or bacteriological, are published in the *Journal of Agricultural Science*: those dealing with the botanical side are published in the *Annals of Botany*. Papers intended for farmers are published in the *Journal of the Board of Agriculture.*

Agricultural Demonstrations.

Writing in the *Modern Review* for May, Mr. Dvijadas Datta draws prominent attention to certain mistaken notions about agricultural improvement in India. It is useless, he says, to import Welstern ideas of agriculture because the conditions in the West and in India are different. "The Ryot in India is indeed a farmer but his European brother would be ashamed to dignify him with the title of farmer – a name that even the crowned heads of Europe are proud to bear. An average European farmer has a farm extending over many hundreds of acres, while the average Indian Ryot has a farm extending over only three or four acres. A European farmer's land is usually situated in one compact block and well fenced in, while that of the Indian Ryot is divided in a number of very small plots and that too scattered in opposite directions in one neighbourhood,—so that it is impossible to fence it in. While the European farmer is usually a large capitalist, the Indian Ryot has almost no capital, except what he can borrow from the *Mahajan* at a fabulous rate of interest on the security of his small holding."

Improved implements, however useful they may be abroad, are not of much use in India, because they are costly and owing to carelessness, ignorance in handling, they may prove a source of positive loss. Similarly what may be scientifically of the highest value in agriculture may be useless to the ryot owing to his illiteracy and the atmosphere in which he moves and has his being. Thus, carbon bisulphide is recommended by the entomologist

as an effective remedy against the attack of insects on stored grain. How many ryots could use this safely ? In Mr. Datta's opinion, to make the Agricultural Demonstrations given by the Agricultural Department effective, the first thing to be done is to convince the ryot that even with such resources as he possesses, it is possible to make a larger profit than he actually does. It is a great mistake to use all the resources that the Government can command to give a striking demonstration without any regard to the amount of capital employed for the purpose, or the profit actually derived from the operation. Everything should be done to make the ryot feel that the demonstrations of the Government are not meant for mere *Tamashas*, but for models to guide the ryot's daily life. Keeping the real problem before their eyes—that of showing a greater profit with the same capital as the ryot's, let the demonstrations be given by the department working a farm consecutively for five or six years—for real profit—on an area of land about equal to that of the average ryot of the locality, and a working capital not much exceeding that of an average ryot. Or better still, let the Agricultural Department arrange with a Ryot, and take over temporary charge of his farm and show by actual demonstration that under conditions in every respect similar to those of the ryot—it is quite easy to draw according to the improved methods taught by the department, and with the use of the implements recommended, but without any additional capital, a larger profit than the ryot is getting, and that those methods and implements are well adapted to the conditions under which the ryot has to work. The sites for these demonstrations may be shifted from centre to centre, in different localities. The plan is extremely simple and would be comparatively inexpensive ; at the same time it is bound to be effective in as much as the lessons given by the department beginning from the very A, B, C of scientific agriculture, would be brought home to the Ryot by the certain prospect of securing a higher profit with his existing resources. In following the plan here suggested, the Agricultural Department would have followed the right line of action and would fully justify its existence. If, on the other hand, the Agricultural Department with their improved methods and implements of working a farm under conditions similar to the ryot, fail to show a higher profit, or if the department be unwilling to work a farm on such conditions, it will serve as an eye-opener, and help all concerned to understand the real situation.

Irrigation and Yield.

It is a standing complaint with the Engineers and Government officials in charge of irrigation works that the ryot in India is wasting

Yield in lbs. per acre.

Crop	Irrigation water in inches								
	5	7½	10	15	25	30	35	50	55
Wheat	4 969	5 545	5 684	6 279	6 672	—	7 229	7 999	—
Maize	—	10 757	12 762	13 092	13 356	14 606	—	—	12 630
Alfalfa	—	9 094	6 942	8 369	8 606	8 133	—	9 949	—
Beetroot	—	6 080	8 053	8 636	10 076	10 271	—	11 528	—
Potatoes	2 310	2 730	2 925	3 405	4 005	3 660	—	3 795	—

a lot of water and if he will but economise his requirements, more lands could be irrigated than is now possible. The ryot however quotes his old proverb that "the greater the supply of water, the greater will be the yield of paddy." There is apparently truth in the ryot's contention as shown by the results of the irrigation investigations carried out at the Utah Experiment station.

It appears that during the period 1902-1911 a large number of crops were grown on the Greenville experimental plots with various amounts of irrigation water, in order to investigate the influence of the water-supply on the yields obtained. The average results for five of the chief crops are given above.

It will be seen that the yields increase with the amount of irrigation water applied, but with each additional increase in the irrigation water, the corresponding increase in yield diminishes, till a point is reached where further applications merely reduce the yields. This point is above 50 in. for wheat, alfalfa, beet and potatoes, but lies between 35 and 55 in. for maize. It seems, however, that when certain crops were grown without any irrigation at all, they produced from 67 per cent. for potatoes to 85 per cent. for wheat of the yield obtained when 7½ in. of water were applied. As the total amount of irrigation water in any district is usually limited, the question of utilizing it to the best advantage is of great importance and the above figures would indicate that far larger yields of produce could be obtained by spreading a given amount of water over a large area than by concentrating it on a smaller one. This fact apparently accounts for the views of the Government but it is clear as shown above that a moderate use of the water will not pay the ryot as much as a copious supply.

Other experiments for investigating the number of irrigations and the time of year at which they should be applied showed that in a general way the best results were obtained when the applications of water were distributed so that the soil remained approximately equally moist throughout the growing season.

In a certain number of the trials, the crops were sampled, just before each irrigation, and subjected to analyses in order to ascertain the proportion of leaves, stalks, etc., in the plants, and the chemical composition of the different parts. The following conclusions were reached.

The plants grown with much water tend to be more leafy and, in the case of cereals, to have relatively lighter heads—the percentage of grain in the wheat crop varying from 33 per cent. where 50 in. of water was used to 44 per cent. with only 5 in; these differences become evident early in the season.

The percentage of *water* in the parts of the plant above ground decreases with the amount of water applied, while in the underground parts (tubers of potatoes and roots of beets) it tends to remain constant.

The *ash* content on the other hand increases with the irrigation water in the aerial parts of the plant, and varies inversely with the irrigation water in the subterranean parts of the plant.

The *protein* content varies inversely with the irrigation water in all parts of the plant.

Enlarging the Agricultural Unit.

Mr. E. Davenport, Dean of the College of Agriculture, University of Illinois, writing in *Business* points out that one peculiarity of agriculture and of country life in America lies in the fact that the family has been not only the social unit but the business unit as well. Whatever future development may bring about socially, nothing is clearer now, he says, than that this unit is too small for economic purposes. There are three great business operations which require a larger unit than the single family for their best transaction; namely, credit, the selling of products, and the buying of supplies.

It is strange indeed, as we think of it, that the last of these three, which is of the least consequence of all, was the first one in which reform was attempted largely through the efforts of the Grange. It is perfectly clear upon slight reflection that the selling end of farm affairs is of much more consequence than

the buying. The farmer is not a large buyer, but he is a large seller. So far as buying is concerned, he can quite well afford to avail himself of the same machinery by which others are supplied; but the question of selling is more complex, and for obtaining credit he has no proper machinery whatever. Both of these problems require some form of combination.

The fruit growers of the West have been compelled to find the solution of the selling problem, having learned by bitter experience that as long as the individual operated as he had done in the East, no profits were possible; and the German farmers have shown a way by which the pooling of land holdings may constitute the very best possible credit for temporary loans at low rates of interest.

"Jones alone will never be able to reach a distant market, nor will he be able to furnish a constant food supply of standard grade, unless he happens to be a man of unusual brains operating on a large scale; however, as soon as his produce is handled by a company of which he is a member, it is at once standardized, and the producer and the consumer alike are protected by a disinterested party—a combination that is mutually profitable.

"The same conditions obtain in temporary loans. Jones, desiring a short time loan, goes to the bank. He is able to offer what, from considerations of safety, is the best security in the world—land. It is not, however, good bankable security, and the result is that he pays the highest rate of interest. As soon as he combines with his neighbours, he is able to arrange for large loans on longer time than that with which an individual could be accommodated, and at a much lower rate of interest.

It is perfectly evident that evolution in this direction must come. The great obstacle to it is the intense individuality of the farmer, which is bred in the bone and nourished by generations of independent business. It will require, says Mr. Davenport, the leadership of the best men to organize and set in motion this new machinery of co-operation.

Plant Nutrition and Nitrogen.

We give below from the *Tropical Agriculturist* a summary of a paper by Dr. F. L. Stevens, of the Porto Rico Agricultural College, read sometime ago before the Society of American Bacteriologists at Washington, and reproduced in *Science* :—

In spite of the close study of the relation of nitrogen to plant life, during the last two centuries, there still remain some of the most fundamental questions for solution.

It has been clearly demonstrated that nitrogen is essential to plant life and certain of its functions in plant economy have been definitely ascertained; but it is rather puzzling to find that though a soil contains an abundance of available nitrogen sufficient for a number of crops, it is benefited by the addition of still more nitrogen. It has been suggested that nitrogen compounds may serve other uses than being absorbed or even assimilated. But what uses?

As an element of nutrition, however, the importance of nitrogen cannot be questioned; and this raises the question, "In what forms is Nitrogen available to the plants"? The answer to this has been emphatic, and has been accepted for many years, but it is thought that it has been founded on insufficient evidence and therefore likely to be modified as the result of further research.

The generally accepted view is that the nitrogenous food of plants takes the form of nitrates.

Nitrification is the result of two processes—the conversion of ammonia into nitrites and the latter into nitrates—each process depending upon the activity of specific groups of bacteria. Ammonia is thus essential to nitrification, and ammonification of organic matter may be said to go on in all soils. Only in exceptional cases is ammonification retarded by the action of predatory protozoa. But there has been a misconception in supposing that nitrifying organisms are practically present everywhere—an assumption which a bacterial soil survey by Dr. Stevens shows to be unwarranted; so that while there is no

deficiency in ammonification, the degree of nitrification may fall below the requirements of a good crop. The reason for nitrification being less vigorous in some crops than in others is not known. It may be due, in some cases, to excessive acidity, moisture, etc., but in others no reason is assignable. Abundance of organic matter cannot be said to check it, since it proceeds in pure cattle manure.

"Denitrification," or the destruction of nitrates by bacteria is detrimental if it proceeds below the ammonia stage, *i.e.*, if it results in oxides or free nitrogen. The mixing of nitrates with blood, cotton seed, etc., should afford ideal conditions for denitrification, but no definite experiments have been made to ascertain what conditions favour or retard the process. Dr. Stevens thinks it absolutely necessary in bacteriological work to make tests in soils and not solutions, pointing out that organic matter inhibited nitrification in solutions but not in soils.

Is Nitrification of superlative value as we have been led to believe by scientific workers?

Organic nitrogen may be in the form of proteids, albuminoids, anides, and alkaloids, and the bulk of the soil nitrogen exists as acid-anides and amino-and amino-acids. The tendency at the present day is to refer to ammonia as well as nitrates as being available to plants.

Neither actual manurial field tests nor water culture experiments have clearly determined the exact form in which nitrogen is taken up. Pitsch and Maze believe that ammonia is not less valuable than nitrates in the case of some plants (*e.g.*, maize). Peaty soils devoid of nitrates support an ample growth, while rice responds well to ammonia in soils where no nitrification can be detected. The presumption is that certain plants respond readily to organic matter or ammonia, and that nitrification is often not an essential factor. The general conclusion is that ammonia and nitrates can be used by plants, but their relative availability has yet to be determined. That ammonification is the essential thing and nitrification is of secondary importance is indicated but has still to be proved. With definite knowledge we shall be in a position to meet the requirements of plants by raising or lowering the tendency to nitrification or denitrification. To attain such knowledge, plant-physiology must join hands with soil bacteriology.

Sisal Hemp.

With the gradual but constant demand for a supply of good commercial vegetable fibres, whether for textile, ropes, cordage or other purposes, there would seem to be, according to Mr. H. F. MacMillan in a Ceylon contemporary, a promising future for so valuable a fibre plant as the Sisal Hemp (*Agave rigida* var. *sisalana*). This plant furnishes the commercial and well-known Sisal hemp from its leaves, and has been in recent years somewhat extensively cultivated in South America, Hawaii, as well as in British, German and Portuguese East Africa. It bears long thick, succulent leaves, 4 to 6 feet in length, usually smooth-edged and ending with a terminal spine. The flowering or "poling" (from the fact that the inflorescence is produced on a long upright pole, 10 to 12 feet in height, which springs from the heart of the plant) takes place when the plant is about 7 to 8 years old. "Poling" affects the quality of fibre; therefore in order to preserve the latter, the "pole" should be cut at about 3 feet from the ground, all ground suckers being also removed for the same purpose. If desired for propagation, however, the flowering pole should be allowed to grow, when on an average it will produce from 2,000 to 3,000 bulbils. The latter are an interesting provision of nature, since the plant produces no seed.

When collecting the leaves for fibre, the lower and older ones are taken first. This usually takes place in the third or fourth year from planting, when, under favourable conditions, an average of 25 leaves per annum may be obtained from each plant. Subsequent cuttings may be made at intervals of about six months until the plants have reached an age of about 8 years when, it is considered, the plants should have furnished a total average

of about 250 leaves. The plants then cease to be productive, and the ground should be cleared and replanted. It is, however, stated by some planters that a plantation may be maintained in a remunerative condition by merely removing the stumps of the old exhausted plants and thinning out the suckers to the requisite number, but this method is not considered satisfactory.

With regard to yield, an experimental plantation formed in the Madras Presidency, "on a poor, red gravelly soil," with a rain fall of 23 inches, and concluded in 1911, is officially reported to have given an average yield of 37 per cent. of fibre, the total return per acre (for 900 plants) being about 300 lbs. Sir Daniel Morris, however, estimated a return of 60 lb. from 1,000 plants, while as much as 800 lbs. per acre has been recorded in an American report on Sisal Hemp in Hawaii.

The plant will thrive in either a dry or moderately wet climate and is not exacting as to soil, though the best returns are produced on good loamy land. It may be said that soil which would be too poor or dry for most other crops would suit the Sisal hemp plant. On average soils, the suckers or bulbils may be planted at distances of 8 feet by 5 feet giving 1,089 plants to the acre. In the Madras plantation above referred to, plants were spaced at 8 feet by 6 feet apart, that is, at the rate of 900 plants to the acre.

The Study of Soils.

The following is taken from the Bulletin No. 85 of the Bureau of soils of the U. S. A.

"The old idea of soil investigation was to collect samples, examine them in the laboratory and see what differences could there be determined ; the newer idea is to study the characteristics and properties of soils in the field, classify them according to obvious differences, and, with this information in hand, use the laboratory as a means of ascertaining the cause of such variations as cannot be determined in the field. This method of attacking soil problems is the reverse of the usual practice, but because of the great difficulty in duplicating field conditions, it is believed that a field examination should precede laboratory studies. The field observations can thus be used as a check upon laboratory investigation, and as an aid in their interpretation. Field studies furnish a safe and necessary anchor with which to keep the laboratory experimenter from being dashed against the rock of pure speculation. The classifying and mapping of the various soil types, together with the study of the conditions and processes under which they have been formed, will furnish essential and invaluable data for the conduct of laboratory investigations. Nature's great laboratory is in the field, and a study of her methods cannot fail to offer many valuable suggestions, and, in some cases, is the only means of solving her problems. It is through a combination of field and laboratory investigations that an understanding of this extremely complex body – the soil—can be reached."

The Bulletin treats exhaustively of the soils, their origin, formation and best treatment for agricultural purposes, the great difference between the many types, and adds :

"Since the soil varies so much as regards both its inorganic and organic constituents, marked differences in character must necessarily result from the almost indefinite number of combinations which may be found. All these differences, however, may be traced to two sets of factors : First, the character of the rock or material from which the soil has been derived ; and, second, the processes or agencies by means of which this material has been changed from mere rock or rock debris into a medium suitable for the growth of plants. The former has to do with soil-forming material, the latter with soil forming agencies. To these two groups of factors are to be attributed the numerous variations in soil conditions found over various parts of the earth.

"The importance of distinguishing between these two groups of factors cannot be too strongly emphasized. The tendency in the past has been to stress the former to the neglect of the latter, and this has resulted in classifying together soils of very dissimilar character, simply because they were derived

from the same rocks or from rocks which have been formed in the same manner."

The Future of American Cotton.

Cotton spinners of all countries have for so long been dependent upon the United States for their supplies of raw cotton that American cotton growers, merchants and exporters have been led to believe that this state of affairs would continue indefinitely, and that the United States would fix the cotton prices of the world. Of the world's total consumption of raw cotton in 1911, which amounted to 19,013,000 bales, the United States supplied 11,408,000 bales, or almost 60 per cent., and all other countries only 7,600,000 bales. Such conditions, as is well known, have led to excessive gambling by speculators, which has so inflated prices as to be a serious menace to spinners, whose only hope is to be found in a free market, uncontrolled by speculative competition, with a supply furnished by many producers. Whether that hope is likely to be realized is considered in an interesting article by Mr. John V. Hogan in the *Journal of Political Economy*, of Chicago. He discusses the success that has so far been obtained in the various countries where cotton is produced and shows that, besides the great producers fifty years ago, seventy-two other countries are producing and exporting cotton on a rapidly increasing scale. Apart from India Egypt, China, and Brazil, the remaining countries, where the industry is largely of recent development, have increased their production and exports from 797,550 bales in 1900 to 2,886,177 in 1910, an increase of over 260 per cent., and they are developing now at an even more rapid rate. In the same period, the increase in the United States crop was only 17 per cent. There are probably no less than 1,800,000 square miles of good lands into which cotton culture is being profitably introduced in Russian and Chinese Turkestan and Mongolia, Mesopotamia, Uganda and British East Africa, Rhodesia and Nyasaland, the Anglo-Egyptian Sudan, Abyssinia, the Congo, Nigeria and Madagascar. This means an area over thirty times as large as the entire cotton acreage of the United States in 1911, and yet it does not include sixty other cotton-producing lands which may be able to supply an equally large cultivable area. In the near future, therefore, it is probable that cotton will be growing in a great number of countries in sufficient quantities to meet the world's requirements, when the price will no longer be controlled by speculative interests. Mr. Hogan thinks that, under these circumstances, the future of the American Cotton trade is now in the balance. The world's spinning industries, which have suffered so severely from the manipulation of the American Cotton Exchanges, have determined to obtain relief at any cost from further American control of the fibre. Much has already been done in that direction, and what the future will bring may be plainly foreseen. In 1889 the United States produced 63½ per cent. of the world's output of cotton, in 1909 it was 59½ per cent. and in 1912 it will probably be about 58½ per cent. Apparently it will not be many years before the American crop will be less than one-half of the world's production and unless the United States can greatly increase its crops by improved methods of cultivation and will sell the output at reasonable competitive prices in the open markets of the world it will have to take a lower position in the list of the world's suppliers of cotton.

Fertilisers for Cocoa-Palm.

It is generally recognized that phosphoric acid and nitrogen are more clearly useful than potash, although the latter is also necessary.

Farm-yard manure is one of the best fertilizers; cakes, organic manures and ground bones are also excellent, as is also especially the green manure consisting of the leguminosæ which have formed the intercalary crop. Common salt, which has been hitherto regarded as a very good fertiliser for the cocoa-palm, is no longer in favour and it is considered that chloride of potash fertilizers are sufficient.

The Co-operative World.

The Transformation of the Co-operative Movement.

IN the March number of the *Indian Review*, the Hon'ble Diwan Bahadur L. D. Swamikannu Pillai, M.A, Registrar of Co-operative Societies in the Madras Presidency, outlines the succ ss achieved by the co-operative movement within the eight years of its introduction into India, as a result of an enormous output of labour and sacrifice, albeit unconscious on the part of those thus joined together. The work of the panchayets or committ es are mostly gratuitous and the panchayets have to keep a sharp look-out on the doings of members. Various restrictions are imposed on the members. The most rigid economy has to be practised and enforced, even in regard to necessary expenses. The margin of profit to societies, which seldom exceeds 2 per cent. in the Madras Presidency, is carried every year to a reserve for common good. Members constantly contribute for the expenses of unions, local and provincial conferences, public manifestations of loyalty, etc The members of rural societies undertake unlimited liability. In spite of these restrictions and obligations, the movement has, says the writer, surpassed the most sanguine expectations.

One reason may be assigned for the success of the co-operative movement, which may enable us at the same time to gauge the limitations of its success. Of all commodities purchasable in this country with money, none is so rare, economically speaking, as money itself. Food, clothing, lighting, means of locomotion, education, books, stationery and generally all articles included under the head of standard of comfort, may be purchased in this country at the same price as, and in many cases at prices much lower than, in most countries of Europe. For money alone we, Indians, pay double or treble the price, or rate of interest that obtains in Europe.

The Government who very early had their attention drawn to this anamoly devised various measures to combat the evils of usury and the co-operative movement was destined to be the last of such measures.

The main question, according to the writer, which faces the movement at present is how shall it expand in the near future ; and on this point he says :—

If Government have not yet definitely declared their future policy in regard to co-operative societies, it may be that they wait for the societies themselves to take their choice and decide for the better part.

Co-operative credit has no doubt achieved a good reco d so far as the past is concerned, but self-help appears to be for the future its destined end or way. Instead of dogmatizing as to the directions in which societies should practise self-help, it would probably serve a more practically useful purpose if we examined the forces already working in this direction. In the first place, there are a certain number of societies, though as yet there are less than a hundred of them, which, not content with obtaining the bulk of their capital from Central or District banks, raise it locally by means of shares, deposits and loans. There are other societies which raise sufficient local capital to be able to advance loans to other societies in their neighbourhood. Co-operative societies in towns, working on a limited liability basis belong to the class of self-helping societies and find their own capital. Five or more rural societies, working in the same neighbourhood employ at their own expense a common official called a group examiner, whose duty it is to go the round of the societies very frequently and keep them up to the standard of efficiency. When twenty to thirty rural societies are situated within a radius of seven to ten miles from the centre of the group, they form themselves into a union, which is registered as such under the Act, and whose functions are similar to those of the Registrar in that they comprise organization

of new societies and control over all the societies in the union, exercised through the governing body of the union and the Union Supervisor, the latter being an official appointed by the union and paid out of contributions by member societies.

The above are a few of the directions in which the gradual transformation of the co-operative movement into an organization of self-help is being effected. Without such a transformation it is useless to hope for higher forms of co-operative activity, such as agricultural or industrial or productive co-operation. Already a few grain-banks and agricultural associations have been formed by certain societies on their own initiative and it is not unlikely that societies for co-operative purchase and sale may also be formed in due time. So long as these organizations owe their birth to ideas of help and co-operation evolved among the people themselves in consequence of their practical familiarity with the nature and requirements of co-operative credit, the new institutions will be healthy and capable of growth and further expansion.

The Benares Co-operative Dairy.

Ardent co-operators are ever on the alert to find out all possible forms of co-operative enterprise. To them the experience of Societies elsewhere will be of great practical assistance. To such of the co-operators who are thinking of establishing co-operative dairies in large towns, the experience of the Benares co-operative dairy will be valuable. The possible profit and the practical difficulties in working a co-operative dairy may be easily gathered from the following report of Mr. A. C. Chatterjee, the Registrar of Co-operative Societies in the U. P. on the Benares Co-operative Dairy.

The Vishweshwar Co-operative Dairy at Benares is an institution started and owned by Ahirs and not by capitalists. To remove at least partially the great complaint about the impure milk supply of the town, the idea of starting a dairy to supply pure and fresh milk was suggested to the Ahirs and some of them took it up. They organised the business with the help of Babu Shiva Mohan Lal, Inspector of Co-operative Societies. A manager was appointed to work under the guidance of a committee of Ahirs who elected Babu Moti Chand, a leading resident of Benares, as their President.

The society was registered in June 1911. The shareholders are almost exclusively the Ahirs and they have paid Rs. 354 in shares so far. They will continue to buy shares from their savings. No other capital is employed if we exclude the cash credit of Rs. 100 which the Benares Bank has sanctioned and the amount borrowed to build sheds. Sales are made for cash and the sale proceeds are enough to meet current expenditure and leave a margin for profit. The manager keeps the accounts. There is also a credit branch for advance of loans to the Ahirs.

The dairy management purchases milk from the individual shareholders (the Ahirs) at ten *seers* for a rupee. The feeding of cattle and the milking is conducted in the presence of the manager, the headman of the Ahirs, and some servants. The milk is collected in cans, locked up by the manager and carted to the city in charge of the salesmen. The cans have pipes attached to them ; the contents can be taken out but nothing can be poured in. One horse cart and one *ekka* are at present employed for cartage. They take the milk morning and evening to the five shops which have been opened in the various quarters of the city and the milk is sold there to the general public. The rate is eight *seers* a rupee. Shops have been taken on rent and one salesman works at each. The manager goes out from time to time to see how they work and to attend to complaints. There is a great demand for the milk. The crowd at the shops is sometimes as large as at the third class booking offices in large railway stations.

The dairy is situated outside municipal limits, about four miles from the centre of the city. A plot of land was taken in the beginning on lease and is still in occupation. An opposition set in soon after on behalf of vested

interests; the other Ahirs and professional dealers left no stone unturned to discredit the organisation and to injure it. They spoke to the owners of the shops to eject the salesman, and also to the landholder and his agents not to allow any more land to the dairy. Shops had to be changed or rents raised and the servants of the landholders had to be propitiated. On one or two occasions some Ahirs armed with *lathis* came to threaten the salesmen at the shops. The landholder and his tenants raised difficulties when they were approached to give some more land for extensions. In this matter the aid of the district authorities was sought through the Registrar of Co-operative Societies and they settled reasonable terms with the landholder and the occupancy tenants. One tenant is still objecting. This is about the only matter in which help has been given by the authorities. No help has been given by the Municipality.

The success of the dairy was soon noticed. People thought there was a good deal of profit and hardly two months were out when a rival shop was opened in the immediate vicinity. In this case some men combined to buy milk from the Ahirs in the city and put them in cans similar to those of the dairy, rented a shop adjoining the dairy shop and brought the milk there for sale. As they had not to traverse any distance they often managed to reach their shop earlier and customers who did not like to wait bought from them. They had also a comparatively small quantity to sell. The rival shop is now on the decline. A capitalist however who had his dairy at Calcutta and who would not make it a success there is shifting to Benares and some of his cattle have already come.

The management has found from experience that there is not much profit in this business if it is run on modern lines, but that it can pay its way. In Benares specially even well-to-do people are not willing to pay a little extra price for good and pure milk. The dairy has three ponies and it had to pay on account of their feed, treatment, occasional break down and hired labour Rs. 900 during the last year for transport. There were also occasional surpluses of milk which resulted in loss *Dahi* or butter is generally made of the unsold milk but they yield much less profit than milk. The surplus is occasional, so it will not pay to engage a permanent establishment to deal with it. An attempt was made to sell the extra milk to sweetmeat-makers at a slightly reduced rate but they are somehow in opposition and are determined not to give any help.

It has also been found that the best customers are common people who buy for cash and give no trouble. Formerly the manager made it a point to supply to public institutions and rich men, but delays, deferred payment, the question of commission to servants, etc., came in the way and he has now definitely given up the practice. The manager has also hitherto failed to solve the question of a house supply, for Benares is peopled mostly in lanes through which no carts can pass. A sufficient number of customers living in one locality has also not come forward to pay the extra cost of labour.

The dairy has about 100 heads of cattle of which about 30 are dry. There are more buffaloes than cows. The outturn of milk now is nine maunds per day but the quantity goes down in the summer.

A pucca shed for cattle is in course of construction. Babu Moti Chand, the chairman of the committee, has lent the requisite capital at 6 per cent. per annum. When the Ahir shareholders require capital to purchase milch cattle it is advanced to them by the credit branch of the society at 15⅝ per cent. interest.

In view of the great importance from a sanitary point of view of a pure milk supply to large towns, I think, local bodies should come forward to help us with land and buildings, on a low rate of interest if not altogether free. Many of the initial difficulties will then be easily overcome.

A separate society has now been organised to supply pure *ghi*. This society also belongs to Ahirs, living in the interior of the district. Arrangement has been made to collect *ghi* from them and send the same to Benares for

sale. The price is credited to them after sale. In this business also profit is not the main consideration.

Co-operative Credit in India.

The following article is taken from the *Journal of* the *Board of Agriculture* :— In India with its immense area and its population of 315 millions, the cultivation of the land is almost entirely in the hands of small holders, farming from 1 to 50 acres each. Many of them own the land they cultivate ; but even where this is the case, they find great difficulty in obtaining at a reasonable rate of interest the capital they require to borrow in order to carry on their agricultural operations. In many parts of the country the ordinary rate of interest charged to the peasant by the village money-lender, who is the main source of supply of credit, is from 30 to 40 or 50 per cent. per annum, and for the whole of India the average rate is somewhere in the neighbourhood of 20 per cent. These high rates are due to the precariousness of the harvests, to the scarcity of capital available for loans as compared with the demand, and to the unsatisfactory relations between the money-lenders, who often take advantage of the ignorance and illiteracy of their debtors, and the peasants, who struggle to avoid the exorbitant claims of their creditors and are often unpunctual in the repayment of their debts.

With a view to improving the security of lenders and reducing the rate of interest payable by borrowers, the Government of India in 1904, after a careful study of the experience gained in various European countries, resolved to introduce the system of co-operative credit, which had been so successful elsewhere, and passed a Co-operative Credit Societies Act, based upon that experience and upon the Friendly Societies and Industrial and Provident Societies Act of the United Kingdom, with such changes as were necessary to adapt them to Indian conditions. That this measure has proved a success beyond the dreams of its most enthusiastic advocates, will be seen from the following statistics for the year 1911-12.

In that year the total number of co-operative societies in India increased, from 5,432 to 8,177, the number of members rose from 314,000 to 403,000, and the total working capital from £1,358,000 to £2,238,000 The amount issued in loans to members during the year was £1,191,000. It must be remembered that a pound in India means much more than it does in England as may be realised when it is considered that the average daily wage of an unskilled agricultural labourer is about 3*d*. in India, while in this country it is about 2*s*. 6*d*., or ten times as much. The amount lent by societies to their members last year would, if spent entirely in wages, have enabled them to employ 95 million days' labour, and if spread over the total number of members, would have provided each of them with enough to pay the wages of a labourer for two thirds of the year.

The societies are divided into three classes-central, urban and rural—and the following figures relate to rural societies, which are almost entirely composed of small cultivators living in villages. The number of these rural societies increased during the year from 4,957 to 7,562, the number of members from 236,000 to 325,000, and the working capital from £727,000 to £1,215,000. During the year members deposited with the Societies £85,000 and repaid loans to the amount of £503,000 Deposits were withdrawn to the amount of £52,000 and the new loans made to members amounted to £935,000. The earnings of the year, which consisted almost entirely of interest on loans to members, were £115,000, and the charges of the year were £73,000, so that the societies during the year made a net profit of £42,000. At the end of the year the total assets of these rural societies amounted to £1, 295,000, of which £1,112,000 were out on loans to members. Their liabilities to persons and bodies outside the societies amounted to £853,000, including £658,000 due to central banks and other societies, £126,000 borrowed from non-members, and £51,000 lent by the Government in certain parts of the country, so that, after deducting these liabilities to outsiders, the societies and their members

between them ended the year with net assets of the value of £142,000, which represents the sum which the establishment of these credit societies has enabled their members to lay by in the course of the last eight years. Of this amount £300,000 were du e to individual members in the form of share capital, deposits and interest, and after allowing for this amount and some other small items, the societies, as such, possessed £140,000, which represents their profits to date from the commencement of the different societies.

This satisfactory result is due mainly to the success of the societies in obtaining advances and deposits, either from members or non-members, at a considerably lower rate of interest than they charge on loans to their members. The rates which the Societies find it necessary to pay in order to secure the capital required for their working vary from about 6 to 10 per cent., and average something like 7 per cent. for the whole of India; and the rates charged by the Societies on loans made to their members vary from about 10 to 15 per cent., and average for the whole of India approximately 12 per cent. The amount of interest earned by societies during the year exceeded the amount of interest paid by them by £45,000, which left them a margin of profit of nearly 5 per cent. on the amount borrowed by them from all sources; and as the committees which manage these societies perform their work without payment, the total cost of administration for the whole of India came only to £8,000, or a little more than £1 per society for the year. Thus the members of these societies have not only found them a safe place of deposit for their savings, but have been able to borrow the small loans they require at a rate of interest which, though it seems high in comparison with the rates current in Western countries, is only about half the rate they used to pay to the village money-lender. The more successful societies, which have built up a large reserve fund, are now beginning to reduce the rate of interest they charge on loans to their members.

The indirect advantages of the movement are also very marked. The establishment in a village of a successful credit society among the peasants themselves has greatly reduced the demand for loans from the village money-lender and comp lled him to lower the interest he charges to other persons who will resort to him for loans. The mainfest benefits gained from co-operation in the matter of credit are encouraging the villagers to combine for other purposes, and one hears of co-operative societies formed for the provision of good seed or improved implements, for the purchase of members' requirements, and for the sale of their produce. Some societies have even begun to take up land for demonstration farms, to build village halls, and to start village schools for the benefit of their children. It is also noted that these societies play an important part in the prevention of disputes and litigation, and bring the people together in friendly fashion, so that the practice of co operation is having a marked influence on the effacement of old enmities and the development of social intercourse among the villagers. The movement is rapidly spreading, and promises to revolutionise village economy throughout the country, by increasing the welfare and raising the intellectual and moral standard of the masses of the people.

Co-operation in Agriculture.

Sir Horace Plunket, the leader of the co-operative movement in Ireland, lectured recently before the Irish Literary Society at 20, Hanover-square, on "The Irish Farmer in a New Rôle." Mr. Harold Cox was in the chair. The lecturer said that throughout the English-speaking world, it was coming to be recognised that ever since the industrial revolution in England all the best thought of the country had been too much concentrated on the problems of urban populations to the exclusion of those of the rural populations. In Ireland they recognised that it was "up to them" to construct a wholly new rural civilisation—that is to say, the agrarian history of Ireland forced them to rebuild, from its very foundations, the social economy of the country. Everywhere the landlord and tenant system

had produced an agrarian conflict, which could only end in the transference of the ownership of the soil to the tiller of the soil. In these islands, which were dominated by the industrial and commercial, rather than by the agricultural, idea, the revolution had been unduly protracted. The situation they had to deal with in Ireland was the substitution, in a comparatively few years, of a peasant proprietary for the landlord and tenant system. Those with whom he had worked for nearly a quarter of a century had agreed on two propositions, which, the American rural economists had also agreed, it was essential to establish and work out in their country.

The first was that in dealing with the modern problem of rural life, they must regard agriculture as an industry into which science must be brought, as it had been brought into every other important industry; that they must bring into the farmers' business the same commercial methods as had been found necessary for the success of every other business; and that they must brighten the social and intellectual life of the people in the rural districts. An Irish formula regarding the solution of the rural problem was "Better farming, better business, better living."

The second proposition was that they had to begin with the least interesting of these three—"better business." Not until a rural community had found it profitable to come together could it be induced to come together for the higher purposes of social and intellectual development. Therefore better business was as necessary for better living as it was for better farming. These two propositions had caused the promoters of an American enquiry to give a great amount of attention to Ireland.

Why was it that farmers in English-speaking countries would not adopt combination? His explanation was that at the time of the industrial revolution, which began in the latter half of the eighteenth century, the idea grew, very naturally, that the secret of political and military strength was to be found in industrial development at home and commercial expansion abroad. Consequently, everything was sacrificed to the manufacturing cities while the rural communities were almost neglected. The fact that the Irish farmer appeared in the new and strange rôle of economic adviser to other English-speaking farmers was due to the old clan instinct which prevailed among them. It was now known that the co-operative system and not the joint stock system was the only method of combination which applied to the agricultural industry, and it had been proved that the successful working of the co-operative method of combination required certain associative qualities which the Irish had and which the English had got to learn from the Irish. No man dare say now that any idea or ideal, other than the co-operative, was even thinkable as a solution of the rural problem in Ireland.

MR. HAROLD COX'S VIEWS.

Mr. Harold Cox said that if the Americans were not able to send us food as freely as formerly, the price of food would tend to rise, and the prospect of making farming pay in this country would be better. Whether, however, that would be good for the mass of the people was another question. In England, where the clannish feeling did not exist and where the people were essentially individualists, there was the greatest difficulty in making co-operative production succeed. The only kind of co-operation which had been a success in England was co-operative shop-keeping—a very simple application of the co-operative principle. Co-operative production had in the vast majority of cases failed. While co-operative farming might be, and probably was, the right solution of the problem in Ireland, it would be a mistake if those in England were to pin their faith to that solution, because it would mean that they would have to overcome a very great human obstacle. The instinct of the people in this country seemed to be much more in the direction of "joint-stockism." He was a little sceptical whether in this country and throughout the world they could develop a relatively larger rural population. He doubted whether

they could get many more people on the land, taking England as a whole, than were there at present. They could not unless there were a larger demand for food. That implied either that the population was going on increasing or that it was going to eat more. They need not smile at the idea of eating more because he believed one of the factors in the rise in prices was that. All over Eastern Europe, for instance, the people were eating more and better food. But unless the mass of the people in the world ate more there would not be a relative increase in the demand for the produce of the land. On the other hand, if the population went on increasing, the towns would increase still further. If they wished to expand the rural population they would have to add manufacturing industries to agricultural industries. If they did that, the purely agricultural population would feed the manufacturing population within a short distance of where the food was grown, while the manufacturing population would live within touch of rural scenery and enjoy all the life-giving effects of rural life. That was an ideal, which, as regarded England at least, they ought to put forward.

SIR HORACE PLUNKETS' REPLY.

Sir Horace Plunkett, replying to a vote of thanks, said he held that the joint stock system was absolutely unsuitable to agriculture. If farmers combined on the joint stock plan, the arrangement always broke down because the management and profit fell to those who put the largest amount of capital into the concern, whereas the small man was far more deeply interested in the success of the concern than the large man.

Co-operation in Madras.

The following extract from the address of the Hon'ble Mr. Ramachendra Rao as President of the Madras Provincial Conference held recently at Trichinopoly will be read with interest. He said :—It is a matter for satisfaction that the Co-operative movement started by the Government with the most beneficent intentions in 1904, is showing signs of expansion in every direction. The movement began with the organisation of the Rural and Urban Credit Societies and may fairly be set to have established itself. According to the latest report ending with the 30th June 1912, 969 Societies and 3 Unions are now serving 3,000 villages. The total amount of loans granted by these societies during the year ending 30th June 1912 was Rs. 2,92,356 and the interest thereon was generally 9 per cent and it was estimated that a lakh of rupees were saved to the ryots in the shape of interest by the operations of these Societies. If we realise the stupendous work that still lies before us for the organisation of rural and urban credit in this Presidency, we shall not have much reason for congratulation though we are satisfied with the progress of the movement so far. We may take the transactions of a single year outside the sphere of the Co operative Credit Societies. I shall illustrate my point by taking the extent of loan transactions for 1909, the latest year for which statistics are available. The total amount of loans obtained on the mortgage of lands was Rs. 9,52,14,329 and the amount lent on simple bonds was Rs. 35,61,697 making a total of 9,87,76,026. This is the extent of the transactions that have come before registration Officers and we are aware that there is a large number of transactions of at least an equal value that do not come up before the Registrations Officers. Of the total number of mortgages a little above half relate to transactions of Rs. 100 and less, and similarly the proportion of loans on bonds of Rs. 100 and less is 63 per cent of the total transactions. We therefore see that the bulk of the transactions relate to the poorer classes and it is these unfortunate men that the Co-operative movement ought to be able to reach in the fulness of time. In regard to the rates of interest, about 5·3 per cent. of these mortgage loans were lent at 6 per cent.; 24·7 per cent. at a rate of interest varying between 6 and 9 per cent ; and in regard to 50 per cent. of the transactions, the interest ranged between 9 and 12 per cent. and in 18·9 per cent. the rate of interest ranged between

12 and 24 per cent. These facts are enough to show that the co-operative movement has barely touched the fringe of the question of Urban and Rural credit and it must not be forgotten that the whole work of the organisation of rural credit still remains to be done. There are very many districts in which the movement has not taken root, where the work of propagandism and preliminary organisation will have to be done by enthusiastic workers in the cause. The various co-operative conferences in different parts of the Presidency are now becoming annual fixtures for co-operative propaganda and the movement is likely to gather strength as we go on. But apart from the organisation of co-operative credit, the movement is also likely to extend in other directions and the resolutions adopted at some of the conferences indicate the possibilities of the movement. The conference at Madura advocated the formation of agricultural co-operative credit societies to undertake all kinds of Agricultural insurance, to secure the best market for the sale of produce , to buy or hire bulls for the use of members of societies, and generally to disseminate knowledge of the latest improvements in agriculture. Another form of co-operation that was suggested at the conference was in relation to the expansion of elementary education, some of the co operative credit societies having undertaken the management of schools. Co-operative credit societies have been frequently urged to undertake the improvement of village sanitation, and the great scope there is for the expansion of co-operative work in this direction, was also much discussed. Co operative housing associtions for relieving congestion have been suggested, and societies like milk and butter societies, grain banks, cattle insurance societies, various forms of distributive societies, societies for the encouragement of village industries, have all now come within the region of practical politics. This enthusiasm for the spread of the movement is not the monopoly of the non-officials alone. It seems to have become the accepted creed of responsible officials. The Director of Agriculture has recently preached a sermon on agricultural co-operation. The Hon'ble Mr. Sivaswamy Iyer exhorted the conference at Madura to promote diffusion of co-operative knowledge, and the creation and cultivation of the co-operative spirit among the people and for the organisation of a band of ardent and enthusiastic propagandists to go forth among the people to preach to them the gospel of co operation. The Hon'ble Mr. Jackson, non-official representative of the Chamber of Commerce, in referring to the enormous increase in the excise revenue in this Presidency, stated that the true solution of the excise problem was in co-operative work for influencing the masses in the cultivation of thrift and temperance. The Hon'ble Sir John Atkinson recently repudiated very warmly the suggestion that the Government were not keen about the development of co-operative societies and made an emphatic declaration that the Government were most anxious about the development of the movement which has hitherto produced the most beneficial results. Gentlemen, both the official and the non-official mind is therefore intent upon the spread of co-operation. This conference will, during the course of its sittings, doubtless undertake an adequate discussion of the whole subject to secure a rapid expansion of the benefits of the movement. Even in the limited sphere of co-operative credit, the impression made by the movement, according to the accepted official opinion, upon the state of the money market in India, is so "slight, sporadic and somewhat uncertain." I do not believe any headway can be made unless the gospel of co-operation is vigorously preached throughout the length and breadth of the land and a campaign of active propagandism is carried on. This work in the present conditions of the country is better done by State agency and under State control and the time has not arrived when this can be done by honorary agency. It has been stated in responsible quarters that the present rate of growth is not consistent with safety and the enthusiasm for the spread of the co-operative movement must be kept in check. A good cause may be as soon wrecked by a cold, calculating prudence which would not take advantage of the progessive tendencies of the times as by a wild and ill-directed enthusiasm. The cause of co-operation in this Presidency is not ever likely to suffer by an excess of enthusiasm. The work before us is so great in volume and so arduous and varied in its character that it is enough to moderate the zeal of the most sanguine worker in the cause of co-operation. The Government need not therefore cultivate the attitude of caution to a degree amounting to a refusal to advance,

The Industrial World.

Swadeshi Sugar Manufacture.

Mr. Mahadev Chintawan Rendse, of Agashi, near Bombay writes to the *Panjabee* about a simple, easy yet profitable mode of manufacturing Swadeshi sugar, which he is prepared to teach practically. The prospective sugar manufacturer, if he has not his own sugar cane plantations, should select and buy the standing canes. These canes are to be crushed at their fully developed period, and the juice at once sent to the heating pan. There the juice is well clarified without using blood, bones or charcoal. The clarified juice is removed to the boiling pan and converted into *Rab*, *i e.*, moist jaggery for sugar.

This *Rab* is next put in the centrifugal hydro-extractor, and when the copper drum of this machine is revolved at a great velocity, molasses, *i e.*, liquid jaggery, is forcibly thrown out and sugar retained inside. The profit of a sugar manufacturer depends on his preparation of *Rab*. Good *Rab* should yield from 50 to 60 per cent. of sugar from it, the remainder being molasses or liquid jaggery, selling at a very cheap rate. The molasses can now be turned into hard saleable *Goor*.

Machinery and appliances required to turn out one Bengal maund of *Rab* per hour would cost nearly Rs. 1,200. Thus the crusher and its requisite materials would cost nearly Rs. 250. The furnace, boiling pans, cooling pans, storage tanks, tins, a temporary thatched shed, etc., would cost Rs. 250 more.

A centrifugal hydro-extractor of 18 inches diameter would cost nearly Rs. 560.

And bringing all these appliances together in a suitable working order would require an expense of about Rs. 150 more: in all Rs. 1,200.

The Expenses and Profits.

A manufacturer working for 8 hours a day can turn out 8 maunds of *Rab* and from it 4 maunds of sugar and 3 maunds of molasses jaggery.

He will have to employ 8 men in cutting and crushing, *plus* the labour of 8 bullocks. The furnace and boiling will require the labour of 3 men.

The centrifugal machine can be worked by five men and one person extra would be required; in all 17 men and 8 bullocks.

The profits would vary according to as the rate of *Goor* is high or less, *viz.*, where *Goor* can be had for Rs. 5-8 to 6 per Bengal maund in the season; there the manufacturer will produce sugar for Rs. 8 per maund.

The selling rate of sugar varies from Rs. 8 for the foreign sugar to Rs. 13 for sugar Desi Benares so that even if the sugar manufacturer sells his sugar for Rs. 9 per maund he may daily earn Rs. 4.

Mr. Rendse says he will teach this method thoroughly and practically within a month.

Factories and Workers in India.

In the year, 1910 there were in India, according to statistics published, 98 factories within the scope of the Indian Factories Act belonging to the State and local bodies. Among these were 16 printing presses, 16 railway workshops, 10 canal and engineering workshops and a considerable number of military arsenals and factories.

Factories worked by mechanical power and owned by companies of individuals numbered 2,834, as against 2,023 in 1909, the more important of these being :—

Cotton gins and presses ...	1,390
Cotton mills ...	236
Rice mills ...	215
Jute presses ...	138
Saws mills ...	101
Iron and brass work and foundries	90
Railway workshops ...	65
Jute mills ...	59
Flour mills ...	37

These represent about 82 per cent. of the total number of factories worked by the mechanical power. The factories created by the cotton industry exist principally in Bombay, and those relating to the jute industry in Bengal, while most of the rice mills and saw mills are in Burma.

Cotton gins and presses increased from 969 in 1906, to 1,066 in 1907, to 1,183 in 1908, to 1,208 in 1909, and to 1,390 in 1910. There are 565 factories not worked by mechanical power, including 28 jute presses and 11 printing presses.

The daily average number of persons employed in the factories worked by mechanical power and those not so worked was 1,014,241 in 1910, against 951,100 in 1908, and 984,232 in 1909. The number of adult women engaged in the factories under the Act was 115,540, and of children 52,026. Of the total employed, 32 per cent. were in Bengal and 29 per cent. in Bombay, those provinces employing over two-thirds of all the factory labour of India.

The first Indian cotton mill was started in 1851. The average annual number of mills at work in 1879-80 to 1883-4 was 63; and these rose in succeeding quinquennial periods to 93, then to 127, then to 156, then to 195, and then to 218. The number rose to 241 in 1909-10, and to 250 in 1910-11.

The persons employed rose in number from 51,000 to 230,800 in the same period. Of the total number of mills, 105 were exclusively spinning mills, and 19 were exclusively weaving mills, the remainder doing both spinning and weaving.

The total paid-up capital in 1910-11 was a little more than £12,500,000.

Thirty-four of the mills are not owned by joint-stock companies.

Mr. P. N. Bose and the Tata Iron and Steel Works.

The Tata Iron and Steel Works have been highly spoken of in the press, but the true discoverer of the iron-deposit supplying the raw material to them is not widely known, though the *Englishman* and the *Mining Journal of London* recognised in 1904 the services of Mr. P. N. Bose who retired from the Geological Survey of India. *The Modern Review* for May quotes him from part 3, Vol. XXXI—in the Records of the same and points out that the late lamented Tata was prospecting for iron in the Central Provinces and Mr. Bose drew his attention to the Mourbhanj iron. The former's sons negotiated with the latter and an expert, Mr. Perrin, was got to examine the rich deposits. These have the two great advantages of (1) being near the Bengal Coal fields, (2) having skilled smelters in the areas near and around the iron deposits.

Mr. P. N. Bose discovered another iron deposit in the Patiala State, but owing to the absence of coal in such adjacent parts as in the case of the Tata Works at Sakchee, it can be worked on modern lines only if an enlightened ruler of that State overcomes that difficulty.

Chrome Tanned Leather.

Mr. William Martin, of Glasgow, recently delivered a lecture on chrome tanning before a meeting of the Boot Factory Managers' and Foreman's Association of Scotland. He divided his lecture under three heads:—(1) The history of chrome tanning; (2) an explanation of the processes; and (3) an outline of the great outstanding qualities of chrome leather and the wonderful increase in the commerce of the world it has produced. Mr. Martin referred *inter alia* to the superior qualities of chrome leather. In many ways it had, he said, advantages over vegetable tanned leather. Firstly, it was insoluble in water. If vegetable tanned leather was wetted and allowed to remain wet, it would decompose or rot, whereas chrome leather would be unaffected. Secondly, it had great strength. The fibre was wonderfully elastic and would stand at least one-third more breaking strain than vegetable-tanned leather. Thirdly, it was light, being about one third lighter than bark-tanned leather. This did not matter at home, but in some countries it was a consideration. Fourthly, it would stand great heat,

It could be subjected to boiling and the fibre, although somewhat shrivelled, was not destroyed. This was a great advantage in mechanical leather, as often leather used for mechanical purposes perished owing to the heat to which it was subjected. Fifthly, it was not attacked by insects or animals. This was a great advantage in tropical countries where ants were so destructive. Rats or mice would not touch it either.

As pointed out above, chrome tanning has certainly great advantages over the existing methods and it is revolutionising the leather industry, especially in South India. While on this subject, we may as well refer to a new electric tanning process, invented by the Swedish scientist, Dr. A. Groth, and applied on a practical scale in an English factory where, it is attracting much attention. It is stated that one of the prominent electrical firms is soon to take it up for commercial use. With this method, the hides are put in special vats along with metal conductors, so as to carry out an electrolytic action, and this will tan the hides in much less time than usual, for instance, six weeks as compared to several months. Leather of better quality is produced in this way, and the method gives a perfect and solid tanning. The details of the method are not as yet made public. Various electrical devices in the shape of regulators and indicators, also safety apparatus for over-current, make the process almost an automatic one, and in the present trial plant at Kidderminster two persons are all that are needed to take care of the whole. Should anything go wrong in one of the vats, electric bell or lamp signal gives warning at once. The plant keeps running day and night.

Industrial Progress in the U. P.

A Review of industrial progress in the United Provinces during the last ten years, published in the Administration Report for 1911-12, states that the chief industries of the Provinces are cotton and sugar. These are both indigenous industries, and chiefly hand industries. There are now many factories connected with the preparation of these two articles. Silk, embroidery, wool, carpets, and rugs (both woollen and cotton), dyeing, goldsmith's work, brass and copper, pottery and leather, are other industries which are important in various places : whilst jute and iron are coming into prominence. Soap works, ice factories, flour mills, oil presses, printing presses, brick and tile works, glass works, dairies, stone and wood-carving are also found. A few years ago indigo was a leading industry of the province, but is now in a rapid decline : whilst the lac factories of Mirzapur have also closed their doors of late. A striking feature of the industrial system of the Provinces is the way in which industries which have no sort of connection with each other are combined in one factory, so that a mill which at one time gins cotton at another grinds flour or makes ice. The cause is that some industries are of a seasonal nature, and by this method the machinery is kept working all the year round.

The decade (1901-1911-12) and especially the last quinquennium has witnessed a great expansion of industry, whilst Government has devoted much time to its systematic development. The first step taken was to carry out an industrial survey. There was already in existence a number of handy monographs on individual arts and industries, but many of them are now old, and they dealt rather with the actual state of affairs than with the causes of decline of such industries as were indigenous and the possibilities of reviving them. In 1907 a complete survey was begun by a special officer which has since been completed.

Next an Industrial Conference was summoned to consider how industrial enterprise could be encouraged and to frame a system of industrial education. Its first recommendation was the creation of a department to deal with industrial questions and control technical education. This proposal has been carried out. The duties of the new Director of Industries are firstly to inspect technical and industrial schools and advise on such educa-

tion, and secondly to control an office, which shall be a bureau of information for all persons who wish to develop or initiate industries, and thirdly investigate the possibilities of development. The office came into existence in 1910. A technological institute was also recommended, and though lack of funds has made it impossible to carry out the scheme in its entirety, much has been done. A technologicial depart nent has been started at the Thomason College which includes a textile, a mechanical, and an electrical section; whilst the appointment of a chemist with four assistants and the construction of a laboratory and workshops which are to form the nucleus of a technological institute at Cawnpur have lately been sanctioned. The Industrial School at Lucknow has been extended by new workshops and its equipment has been improved; the staff has been increased, and a hostel built. A new industrial school has also been opened at Gorakhpur. A school of design at Lucknow (to teach designing for textiles, metal work, wood and stone-carving, furniture, calico-printing and modelling), an experimental cotton weaving station at Benares and a carpentry school at Bareilly have been opened. Three demonstration schools for popularizing improved methods of weaving have been opened (1908), whilst five similar private schools receive grants from Government. It is said that they are showing signs of progress.

Experiments of a successful nature have been carried out to test the commercial possibility of a cotton oilseed industry. Steps have been taken to amend railway rates for raw produce; and educational facilities have been afforded to their youthful employees by some firms in Cawnpore and elsewhere in the shape of half-time schools.

Referring to the Allahabad Exhibition opened in December 1910 the report states: "There are already signs, especially in the attitude of the landowning classes towards machinery, that it has assisted the industrial awakening of the United Provinces.

The Paper Pulp Industry in India.

B. N. Kapoor, Director and Secretary of the Baib and Wood Pulp Manufacturing Co., Ld., Lucknow, writes as follows in the March number of *The Paper Makers' Monthly Journal.*

As is generally known, the consumption of paper is yearly increasing as a result of the rapid growth of education, until it has become one of the necessities of modern civilisation. The latest statistics put the world's annual consumption at over eight million tons, with a normal rate of growth equal to 25 per cent. in ten years. The total consumption of paper in India is at present about 70,000 tons and is rapidly increasing. About 45,000 of this is imported from Europe, not more than 25,000 tons being manufactured in the country, chiefly from Baib grass, otherwise called Bhabhar, Sabai, Bunkas (*Ischœmum Augustifolium*).

Rags, jute and hemp, which are important raw materials in India for the manufacture of paper, are not available in sufficient quantities, and their price is going up and the transit freights are heavy. Our forests have yet to be explored for suitable wood to be had in large quantities at a marketable rate and time will be required to make more complete investigations concerning the manufacture of wood pulp in this country. The safest and cheapest material towards which manufacturers should direct their energies is Baib grass, which has been in use for many years and is available in large quantities. Baib is noted for its yield of a good strong fibre, for strength, durability, and elasticity, for the manufacture of high class paper, and is superior to the imported foreign wood pulp.

The raw material must be very cheap and the paper maker must confine his attention to such raw material as may be practically of little or no value and interest to other manufacturers, because as soon as textile manufacturers become interested in it, its price will become prohibitive.

Sir George Watts in the "Economic Products of India" refers to Baib grass as follows: "This grass from the most ancient times has

in the localities where it abounds been extensively used for making ropes, strings and mats, surprise has been expressed that the planting community in India does not pay any attention to the cultivation of grasses, etc., for paper making. There is evidently profit in it and what is more, with the output of paper mills increasing every year the demand for some time to come will be extensive. The Calcutta Mills draw their supplies from Sahebgung, Chota Nagpur and Nepal (the Terai) the last mentioned having in recent years contributed fairly largely. The report issued by the United Provinces and Oudh for 1898-99 affirmed the annual production to be 200,000 maunds."

Baib grass grows in abundance as a perennial grass in the districts of Hazaribagh, Sahebgung, Singbhum and Manbhum districts in Bengal, near Poona and in Central India, also in the U. P. of Agra and Oudh, in the Government forests at Ramnagar, Naini Tal, Pilibihit, Kheri, Gonda and Bahrsich districts. The best Baib grass highly prized by paper makers grows in abundance within the Nepal territory. It is extensively bought and used by the paper mills as far as Bengal, despite the high cost of freight.

Paper must of course be manufactured cheaply, as that is the essential factor to its extensive use, and that is what has made the half penny newspaper possible in England.

By the present process grass is collected in the forest, mostly by contractors, and is sent by rail in its bulky state, in some cases many hundreds of miles, incurring heavy freight charges to the paper mills, which transform it first into pulp and then into paper. Their operations are, however, seriously handicapped by the heavy cost of transport as well as the handling charges and the 60 per cent. of waste which the grass contains.

Collecting operations are therefore best confined to a limited distance from the mills, but have long since reached a radius beyond which it is impossible to go. The development of the paper industry has therefore reached its limit under the present system and has indeed threatened in recent years to decline, owing to a diminished yield from the present collecting areas. To make up for this shortage the mills have been compelled to import wood pulp from Europe at a high cost of freight and the price of this commodity is increasing rapidly in consequence of the rapid exhaustion of forests. It requires about 2½ tons of raw material to produce a ton of paper.

Now India is a country of great distances and long railway halts, and it will be readily understood that every existing mill has surrounding it an economic circle beyond which it does not pay to collect and from beyond which the collection becomes unprofitable when multiplied by 2½.

The import of wood pulp clearly shows that it does not pay the manufacturers to obtain large quantities of raw material from beyond the economic circles of collecting areas. There are no doubt enormous supplies of grass available in districts beyond the reach of the mills and the solution of the problem now confronting the paper industry in India lies in the reduction of grass to pulp on sites, thus eliminating at the point of origin the unnecessary and unproductive costs referred to. The paper mills will find it greatly to their advantage to purchase such pulp instead of making their own during the course of the manufacture of paper. At present there is no mill in India to produce pulp for the trade on similar lines as imported from Europe.

The salvation of the paper industry in India lies in the installation of pulp mills near the grass growing districts. The import of foreign pulp will very likely cease and the paper manufacturers will be assured of an enlarged and cheaper source of material which will enable them to extend their production, which has for many years been practically at a standstill.

The whole industry will thus be revolutionised on the lines now followed in Europe, with benefit to both the pulp and paper working branches of it, and it will be a telling factor towards the reduction of cost in the manufacture of paper in future, thus lending

an impetus to competition with the foreign trade in paper.

The guarantee of success in an industrial enterprise is the assured sale of the finished product and the facts and figures quoted above indicate an assured local market for manufacture of grass pulp.

India and Lancashire.

"As year by year the smoke curling from the chimneys of Indian cotton mills increases in volume, it writes the doom of Lancashire against the industrial firmament in characters so black and bold that he who runs may read the decree of the Fates." So says Mr. Saint Nihal Singh in the *London Magazine*.

"An idea of the gigantic strides that the Indian cotton-mill industry has taken can be formed by studying the figures for the last generation. In 1880-81 there were 55 cotton mills, containing 1,434,364 spindles and 12,739 looms, giving employment to 46,530 men. Twenty years later the number of spindles and looms had more than trebled. During the next decade, progress was made at a still more prodigious pace, and in 1909–10 the number of mills had grown to be 216, with 5,773,824 spindles, 74,585 looms, giving employment to 215,419 persons, and producing 593,206,855 pounds of yarn and 215,360,904 pounds of cloth. During 1911-12 the Indian mills consumed 6,000,000 hundred weight out of the 14,000,000 hundred weight of cotton India had produced during that year.

The phenomenal growth of the industry has already enabled the Indian cotton magnates almost completely to rout Lancashire out of one large corner of the Indian market. No longer does Manchester ship much of the coarse cloth to Hindustan, which the natives annually consume by million of pounds. This demand is now largely met by the Indian power mills and by the native hand-looms, which employ two and three quarter millions of men, or really three times as many people, for the wives and children of the weavers work along side of them.

Indeed, the tables have been so completely turned that, whereas at one time Manchester sent to Hindustan large consignments of coarse piece goods, now India exports this same commodity in quantities which yearly are increasing. These shipments are forwarded from Bombay, mostly by the enterprising firm of the Tatas, whose present head is the shrewd Parsi merchant Sir Dorab Tata, the son of the late Jamestji Nassarwanji Tata, the pioneer of the Indian mill industry.

Of course, says Mr. Singh, it would be idle to pretend that India has managed, as yet, to introduce more than the thin edge of its wedge into the oak of the Lancashire mill industry, or to assert that the giant does not still stand seemingly unshaken in its strength and glory. The Indian mills (together with the hand-loom weavers), do what they may, are not capable of supplying more than a fraction of the piece goods required by 321,000,000 natives. India, during 1911-12 was compelled to import £23,040,000 worth of cotton cloth, of which more than nine-tenths came from Lancashire. Oddly enough, Lancashire found the last year to be one of the most profitable in the annals of its trade with India.

This is due not only to the fact that as yet the number of Indian mills is not large enough to cope with the native demand, but also because the Indian factories almost entirely concern themselves with the production of coarse cloth, as they find great difficulties in manufacturing the finer fabrics. These obstacles are of a two-fold nature. First, the native cotton does not come up to Egyptian and American cotton and is not of sufficiently good quality to be woven by machinery into fine cloth. Second, the Indians do not possess the requisite skill for weaving by machinery the finer grades of goods and giving it the finish which the machine-made imported article possesses. Therefore, partically all the better grade of cloth consumed in Hindustan has to be imported from abroad—mostly from Lancashire.

But Lancashire, cannot for long, remain entrenched in this strong position, for the predicament in which India finds itself is only of a transitory nature. Hindustan is making

herculean attempts to overcome the obstacles by improving the quality of the cotton it grows and the cloth made from it, and is rapidly succeeding.

Lancashire, during recent years, has shown unmistakeable signs of nervousness, and sought to do what it could to hamper its oriental opponents. At its bidding, in 1894, the 'countervailing cotton duties' were imposed upon Indian cotton manufactures. The excuse put forward was that since India charges an import duty on Lancashire goods, it must levy an impost upon its own manufactures. Such an argument would not have availed if India had been in the position, say, of Japan-or, at any rate, had not been under British tutelage. But, being politically impotent, Hindustan had to submit to the dictates of Lancashire.

This tax reduces the profits of the Indian mill-owners by $3\frac{1}{2}$ per cent. In 1909-10 the Indian mill-owners paid, in round figures, £267,000 under this head.

"This impost, it may be parenthetically added, not only places India at a disadvantage in competing with Lancashire, but it lays it open to the exploitation of Japan Yearly Japan is sending to the Peninsula more and more cotton goods manufactured in the Japanese State-aided mills and transported in Government subsidised ships.

A suggestion has lately proceeded from Lancashire that it would be willing to urge the repeal of the 'countervailing cotton duties,' provided India agrees to refrain from levying an import duty upon Lancashire cloth. India, however, cannot consent to such a proposal. While it desires to repeal the 'countervailing cotton duties,' it wishes still further to impose an import tax on Lancashire goods heavy enough to protect the Indian mill industry from British competition. There is no doubt that if India ever becomes free, the very first thing it will do will be to build a high tariff wall around itself, more for the purpose of protecting itself from Lancashire than from any other competitor.

In addition to having this crippling tax imposed upon the Indian cotton manufactures, Lancashire is obstructing the advance of the Indian cottonmill industry by refusing to give Indian youths the chance of acquiring practical training in its mills.

But, despite the Lancashire opposition, the Indian mill industry gives every indication of expanding at a rapid pace.

Banana Food Products in Jamaica.

The following extracts from an article in *Suffeon's Foreign Trade Journal* will be read with considerable interest in India:—

Considerable attention was aroused by reports published during 1911 of the development of the banana food product industry in Jamaica, West Indies. A year ago there was but one factory manufacturing the so-called "banana figs" of export while now there are six factories in active operation with another in course of construction and two more companies have recently been formed for the same purpose. United States Consul J. D. Dreher of Port Antonio, Jamaica, has the following to say about this new industry which we reprint from the "Consular and Trade Reports."

The original factory, which has been operating about six years at Gayle, claims to have a secret process for making banana figs. A large factory at Montego Bay had its machinery made after its own designs in New York. Two other companies expect to patent their machines which have been locally designed and manufactured. It is understood that the drying is done by hot air and that it takes 400 to 500 pounds of fruit to make 100 pounds of the figs. For a good many years, experiments have been made in drying bananas, but it has been difficult to find a process for making a product that would keep well. Now that manufacturers are using a variety of machines and apparatus, it is to be expected that the best process will soon be known. Although worms are never found in ripe bananas, the preserved fruit, if left exposed, attracts insects and soon becomes infested with small worms. It is the case also with other dried fruits.

The food products manufactured are fig bananas or banana figs, cooking bananas, banana chips, flour, and meal. All the factories dry or evaporate the bananas whole without the addition of sugar, and yet they

are sweet and palatable, like pressed figs, which they also resemble in colour. At least one factory cuts the bananas into short pieces before drying or evaporating them, thus making a product that looks much like the dried figs of commerce. It seems that it would be well, in order to make a distinction, to call the bananas cut into pieces "banana figs" and those treated whole "fig bananas." What are known as "cooking bananas" are so thoroughly dried as to be hard, the colour of these being almost white. Broken into pieces they form "banana chips," which, not meeting with duties, are imported to be ground into meal or flour in the country of consumption. In spite of the fact that the meal is said not to keep well, one Jamaica factory uses an American gristmill for grinding the chips into meal. Another company has its own factory in London, to which it exports the chips to be ground into flour and meal and made into other preparations for market. A small booklet is issued there to set forth the dietetic value of banana foods as attested by British and German food experts and others; and there is added a list of products on sale, with recipes for their use, etc. These banana food products have been awarded many prizes, diplomas and certificates of merit.

It seems that all banana food products are wholesome and nutritious. The figs are delicious and are likely to be preferred to real figs by many persons. The fig bananas cut into small pieces may be used like raisins to impart an additional flavour to cakes and puddings. The chips after being well pounded or grounded in a coffee or other hand mill, may be boiled and then used as an excellent breakfast food or for making delicious puddings. Gruel, porridge, and other preparations made from banana flour and meal, which are rich in easily soluble carbohydrates, are recommended for infants, invalids, and dyspeptics. The negro women of Jamaica use banana meal gruel as a substitute for milk for their infant children. The banana itself is one of the most wholesome and nutritious of fruits if eaten slowly when it is perfectly ripe (that is, just before it decays), but not when devoured only half ripe, as is often the case, which causes many persons to regard bananas as being difficult to digest.

It seems only necessary to make the value of banana food products known in order to create a large market for them. Already they are to a considerable extent popular in Germany and Great Britain, which have been taking the bulk of the exports of such products from Jamaica. When bananas are selling at a low price, as is usually the case in this colony during the fall of winter, it is quite profitable to use them for manufacturing purposes. As the world's demand for these products increases, it is to be expected that bananas will be grown extensively in districts too remote from shipping ports or railroad facilities to make their exportation practicable. In Jamaica several factories have already been built in such districts. In banana producing countries far removed from large markets, like the Society and the Samoan Islands and other Island groups in the Pacific Ocean, this fruit could be grown at small expense for manufacturing food products. Especially adapted to such an undertaking is Tahiti, the principal Island of the Society Group, which has steamship communication with San Francisco and New Zealand and Australia, all too distant for exporting the fruit itself to advantage except in vessels built especially for that purpose. The Hawaiian Islands and the Philippines also seem to offer inviting fields for the profitable manufacture and exportation of banana food products. Owing to the high price paid in Jamaica for bananas for export to the United States from March to July, inclusive, the factories either discontinue operations during those months or use mostly the small unmarketable bunches of fruit for manufacturing purposes. In order to have a continuous supply of fruit, several companies are making arrangements to grow bananas for their own use. Owing to the prevailing high price of bananas, one company could not undertake to fill a recent order for 100 tons of chips. Another company, which could not accept orders from importers in the United States last fall because its entire output was under contract for shipment to Europe, is taking steps to enlarge its factory in order that it may be in a position to meet the increasing demand. So far as can be ascertained, the combined capacity of the Jamaica factories is 12 to 15 long tons a week; but the output may be considerably increased by next winter. The fig bananas, the chief article produced, are generally packed for export in boxes of 56 pounds each (one-half of a British hundredweight), though some are put up in 1-pound packages. There is no export duty on banana food products. The retail price of the figs in Jamaica is 8 to 12 cents a pound and the export price for figs or chips is about $150 a long ton (2,240 pounds). Samples may be obtained from the factories.

The Commercial World

An Important Judgment re Arbitration.

It has for long been a practice among lawyers and laymen at Karachi to insert, with the concurrence of parties, a clause in the reference authorizing an arbitrator or arbitrators to decide matters in dispute between them with or without taking evidence and that an award passed in these circumstances was final and binding on the parties. Such awards used to pass as good. Recently this point arose before Mr. Hayward, Additional Judicial Commissioner of Sind, in the arbitration matter of Mahomed Ladha *vs.* Alidina and others. The reference contained the clause authorizing the arbitrator to decide matters in dispute between parties with or without taking evidence. Objection was taken to the award passed in pursuance of such a reference. The Court held that such a reference was bad in law, inasmuch as it was no better than a mere toss-up and that the award passed without taking evidence could not be upheld. This decision is of great importance to commercial men.

Legibility of Colored Advertisements.

The French publication *Le Courrier du livre* reports on some interesting experiments which have been made regarding the most favorable color combinations for reading at a distance. It was found that the most legible print was black upon yellow background. The order of merit obtained for different combinations is somewhat surprising, and is as follows: (1) Black on yellow; (2) Green on white; (3) red on white, (4) blue on white: (5) white on blue; (6) black on white; (7) yellow on black; (8) white on red; (9) white on green; (10) white on black; (11) red on yellow; (12) green on red; (13) red on green.

It will be noticed, among other things, that the customary combination of black upon white comes sixth in the list, about half way down.

Mother Seigel's Origin.

The Inquiry into the Sale of Proprietary Medicines reached an interesting stage at the meeting of the Select Commitee, when Mr. C.H. Radcliffe, a Director of A. J. White, Ltd., Proprietors of Seigel's Syrup, appeared to give evidence. The founder of the business gave great publicity to the statement that there was a certain old woman, 'Mother Seigel," who, wandering about the lanes of her native village in Germany one day, plucked a herb which gave her immediate relief from the disease from which she was suffering. The Chairman asked Mr. Radcliffe whether this statement was false, and, after admitting that it was purely fanciful, the witness was further pressed by the Chairman and said, "I am prepared to say that in my opinion it was a false statement, but my opinion counts for little, because I have never attempted to satisfy myself about it one way or the other." No one in his senses would take all 'facts' stated in advertisements for truth.

The Cinematograph as Advertiser.

It is estimated that there are about 250,000,000 dollars invested in the film industry of America. Many American firms are adopting the cinematograph extensively for business purposes. This is particularly the case with the great engineering companies for whom the moving picture demonstrates the value of their products better than an army of commercial travellers could do; better, in fact, than anything else, except watching the actual machines in operation. One large company in Ohio which manufactures brick-setting machines, sand driers, sand-lime, brick and cement machinery, has, we are told, been using motion pictures for some time to demonstrate its goods to direct buyers of this kind of machinery. For the purpose of displaying these pictures, a firm has just put out a small cinematograph machine for the special use of

travellers. The whole machine may be carried in a compact little case. When the salesman brings it into an office he merely draws the shades on the windows, attaches a socket to the electric light, and begins to turn a crank—while the machine he is selling leaps out upon the wall and goes through its workings as noicelessly as a shadow. The customer does not need to study a catalogue.

Business Enterprise in India.

The subjoined statement shows the number and capital of the Joint Stock Companies registered in India in the month of March 1913.

	Rs.
3 Banking and Loan Companies	1,49,992
2 Insurance Companies	1,20,000
1 Tramway Company	18,00,000
1 Co operative Association	50,000
1 Printing, Publishing and Stationery . . .	3,00,000
9 Trading Companies (other than specified above)	29,10,000
1 Cotton Mills Company	1,00,000
1 Tea Planting Company	3,00,000
1 Mica Mining Company	32,000
20 Grand Total .	57,61,992

Promoting Trade by Co-operation.

Where there are many manufacturers engaged in the production of a distinctive local product of equal quality and worth, a single manufacturer can rarely afford to spend a large sum in advertising. To do so is to advertise the products and increase the sales of his competitors. But when this publicity is undertaken with a view to making known the excellence of the collective products of a district, the results, in proportion to the outlay, that accrue therefrom, make such enterprise well worth while.

A Few Valuable Hints to a Retailer.

The difference between the failure and success of a retail shop may hinge on *one idea*-on a single scheme of turning the tide of patronage from other fellow's shop into his own. This is only possible after a pretty long experience. A retailer should first study the local conditions and make his things suit the taste of the local public. He may increase his profits by extending his social connections. Even the doors and windows of the shop should be so fitted as to attract the public. A retailer may save himself by playing upon the weakness of the class of men with whom he deals. He must make it a point to sell his articles at a fixed price and give the best quality possible at that price.

Philosophy of Cast-off Clothing.

Referring to a recent shipment of old clothes to India, a writer in the *London Standard* states that " the cast-off clothing of an Englishman is said to make a brave show for the coloured man. The largest consignments are sent to Bombay, Calcutta, Johannesburg, &c. We dare say those who wear the cast-offs have no idea wherefrom the cheap clothes come. Probably they feel proud to dress and appear like Englishmen—at any rate, as they imagine. Indians, as a rule, are very careless in dressing but the growing disrespect for the national dress has exposed them more to the taunts and jibes of proud races. In London itself the cast-off gowns and garments of West-end folk are worn by the suburban people." Alluding to this, the *London Standard* writes:—

The trade is one of the queerest of all the queer London trades, and there are many women of the lower middle class who are enabled to appear in beautiful gowns entirely because the dealer acts as a go-between for them and the wealthy people who are anxious to sell. Fashion's demands make it necessary that society women replenish their ward robes at least twice a year. Ladies' maids and valets generally have the disposal of the goods that will never be worn again; these are the perquisites of the maid and the valet. A little faking on the part of the dealer makes the garments look like new and then his profit appears.

Mr. Morgan's Achievements.

Some of the most notable movements or events in which Mr. Morgan figured are summarized as follows by *The Wall Street Journal;*

"The development of foreign-exchange business and closer financial relations with the European bankers.

"The enlistment of foreign capital on a large scale in American enterprises.

"The protection of the United States Government from repudiation by the bond sales in the second Cleveland Administration.

"The elaboration of a policy of co-operation among bankers and railroad men for the purpose of preventing cut-throat competition, and securing safety to investors.

"The reorganization of railroads going into the hands of receiver as a result of destructive competition, and the management of the reorganized railroads by voting trust, interlocking control, and gentlemen's agreements designed to secure co-operation.

"The work of procuring stability in the conduct of industrial companies by the organization of the United States Steel Corporation and other large industrial concerns.

"The contest with Harriman and the final adjustment of the difficulties which produced the Northern Pacific panic.

"The assistance rendered in the panic of 1907.

"The concentration of banking power by the combination of banks and trust companies on a larger scale than ever before attempted in this country."

Leather Adulteration.

A meeting of members of the Leather Trade Section of the London Chamber of Commerce was held in London on April 1st. It was reported that a letter had been sent to the Indian Chambers of Commerce drawing attention to the plastering of E. I. kips with earthy matters and oil for the purpose of weighting, and that a reply had been received to the effect that the question had been laid before the Indian Government, who would probably take action in the matter. One or two large importers had also written to the Chamber, enclosing samples of adulterated Indian leather, which were handed round for inspection. It was stated that the Board of Trade were expecting to obtain powers to formulate some new regulations which would make the sale of certain adulterated goods as the genuine article, including leather, actionable. In regard to the use of barium, a letter had been received from Dr. Turnbull, stating that the Northern tanners took the utmost care to prevent their leather being contaminated with that adulterant. The Bristol Tanners' Federation had also replied to a letter sent from the Chamber, stating that they had already co-operated with the United Tanners' Federation in placing the question of adulteration before the Board of Trade. But they thought that the remedy was in the hands of the boot manufacturers, who ought to get a written guarantee of the purity of the leather they purchased. They feared that legislation preventing the adulteration of leather would lead to an increased importation of weighted leathers which, though not cheaper, would be quoted at a lower price than pure English leather, and so be preferred by many boot manufacturers.

Business between Madras and America.

Mr. H. D. Baker, American Consul to the Bahama islands who has been deputed by the American State to investigate the opportunities for extending the trade between India and the United States, was recently in Madras.

Interviewed by a Press representative, Mr. Baker, stated that he was much impressed with the prosperous business conditions of the Madras Presidency, which have caused much stimulation of import trade, especially from the United States. "I am very glad to notice," he said, "the large number of motor-cars used on the splendid streets and roads of Madras. Conditions are ideal for mortor-cars in this Presidency, both for pleasure vehicles and for transport of goods, and the proportion of American cars used seems to show a very rapid increase. The manufacture of motor-cars in the United States has now assumed enormous proportions, and we are doing a big Export Trade all over the world. The City

of Detroit alone manufacture about £20,000,000 worth of mortor-cars per year.

"I think, in the future, American agricultural machinery and appliances will be very much used in the country districts, and the present primitive and wasteful methods of farming will be abandoned. I hope also to see American machinery of all sorts and other materials and appliances needed for your economic advancement, more generally imported.

I think that also from the standpoint of health and comfort, it would be profitable to study American methods of sanitation, such as have been so signally successful in Panama, for instance, in driving out all infectious diseases. This might lead to important importations of American plumbing supplies and enameled bath tubs, and wire screens for keeping the deadly malarious mosquitoes out of your houses."

Here are the directions in which Madras and American houses could open and promote business.

The Indian Companies Act.

The statement of objects and reasons of the Indian Companies Act Amendment Bill says:- The object of this Bill is to supplement the Indian Companies Act of 1913 in respect of certain matters relating to the internal management of the Companies. This supplemental legislation was considered desirable by the Select Committee of the latter Bill in view of the system to a large extent peculiar to India by which some companies are managed by firms of the ManagingAgents whose relationship to the Companies they manage is different from that of a Director to his company in England. The Select Committee was of opinion that in view of the intrinsic importance of these provisions and the fact that they had not been formally before the country they should be circulated before taking their place in the law. The provisions of this Bill are designed to secure, firstly, that every company should have Directors. Secondly, that the majority of the Directors of every company shall be independent of the Managing Agents, exception being made in the case of private Companies and of Companies in which the Managing Agents themselves hold a predominant voting power. Thirdly, that interested Directors shall disclose their interest in contracts to the other Directors and in the case of contracts appointing Managing Agents or any variations of such contracts to the shareholders. Fourthly, that in the case of contracts by Agents of a Company other than a private Company in which the Company is an undisclosed principal, a memorandum in writing of the terms of the contract shall be made and communicated to the Company. It is proposed that this Bill should come into operation on the same date as the Indian Companies Act of 1913, namely, on the 1st April, 1914.

India's Trade.

Mr. S. M. Mitra delivered a lecture on "Commercial Careers for Graduates" at University College on the 28th April. Lord Reay presided, and in introducing the lecturer said that for a long time past Mr. Mitra had been calling attention to the fact that those who traded with India should endeavour to make themselves acquainted with the requirements of the Indian people. The Germans had acted on this principle with conspicuous success.

Mr. Mitra said that India held the premier position in the trade of Great Britain, and he believed, would continue to do so, as long as the mighty British Empire existed. There was no tariff barrier between Great Britain and India. One tenth of the entire trade of the Empire passed through six Indian ports, while the sea-borne trade of India within the Empire was second only to the sea-borne trade of the United Kingdom itself. The trade between India and Great Britain was greater than that of all the self-governing dominions put together. Labour was cheaper and better organised in India than in any other country in the world. England's great rival in the markets of India was Germany. The success of the Germans had been due to their thoroughness In Germany information bureaux existed

where the merchant could ascertain, free of charge, within the hundredth of a mark, how much it would cost to send goods to any part of India. In these bureanx they had a system of tabulating the information, India being divided into 400 sections, 250 for British India and 150 for the Native States. He knew of no such sources of information for the use of traders in England. The result was that in some cases German firms imported raw materials from our own dependency, and, having converted them into manufactured articles, dumped them down in England. There was a splendid opening for University graduates, both men and women, in connection with the trade with India if they would study the scientific methods which the Germans had found so successful, and if they did this they would be benefiting not England only, but India as well.

Sir George Birdwood said that he was in entire agreement with the lecturer, and, as a matter of fact, he had while at the India Office anticipated Mr. Mitra in recommending University men to turn their attention to business.

Business Organisation.

In the struggle that tradesmen are engaged in for success, it does not seem to be sufficiently recognised that proper business management and organisation are quite as important matters as the acquisition of new business. Valuable as the extension of avenues of trade are, it is not to new business solely that traders must look. The proper utilisation of opportunities already at hand and economical and efficient business management will go far to achieve the end in view. Many traders have all the elements essential to success present in their businesses, but they are either lying latent and undeveloped, or leakages and waste, not necessarily extravagant, but more likely unconscious waste, constitute a drain on the vital forces of their trade. There are, of course, errors of omission as well as commission, and the former are probably as serious as the latter. Judicious business management consists of proper organised effort in order to make the most of what business is already at hand, as well as of keeping a lookout for opportunities for development. New trade that is made while branches of the existing main business are being neglected is not true progress. The internal working of a business—that is the theoretical side as distinguished from the purely practical, is too often neglected by tradesmen who, being essentially of a practical turn of mind, are more at ease at the bench than the desk. Yet theory or systematic management is the very foundation of success. Such matters as careful study of sources of supply, checking of goods received, invoices and discounts, estimating and keeping count of the cost of work done, workshop economy, both of time and material, periodical stock-taking, proper book-keeping and prompt collection of accounts when due, will do as much, if not more, to ensure prosperity than the too close personal acquaintance with the work-bench by the master man. The manual labour and bench work can be deputed to others if the business warrants it, but the management and organisation is essentially work that should devolve upon the proprietor himself, and it is to his interests that this should receive the attention that its importance deserves.

WORLD'S TRADE AT A GLANCE.*

BY JOHN J. MACFARLANE.

There seems to be no limit to the expansion of the Commerce of the world. In 1850 the combined value of the exports and imports of all countries was 4,000 million dollars; in 1910 it was 32,400 million dollars, or eight times as much, and in 1911 it was 34,200 million dollars.

* Reproduced from *Commercial America.*

Even in what are known as poor years the increase goes steadily on. It often happens that the decrease in one country is offset by the increase in another. It is a rare occurrence when there is a falling off in all countries at the same time. In 1894 there was a falling off in the export trade of nearly all the European nations as the result of the panic of 1893; but at the same time there was an increase in the trade of countries, like the United States, Canada, Argentina, Brazil, Australia and Cape Colony. The greatest increase in the foreign trade of the world has occurred during the last fifteen years. Since 1897 the average annual increase has been over 1,000 millon dollars. The only year in which there was not an increase was in 1908, following the panic of 1907, when the total value of the world's commerce decreased 200 millon dollars. The greatest falling off was in the trade of the great manufacturing nations, Great Britain, Germany, France and the United States.

While a part of the increase of the world's trade is due to the higher prices of many of the products, a careful investigation would show that this continued growth in the value of foreign trade is due for the greater part to the expansion in the volume of trade. The leading nations are each year confining themselves more and more to the production of manufactured products. They are therefore becoming more dependent on the less advanced nations for the raw materials needed to carry on their industries, and for a supply of food for those employed in their manufacturing industries. Intercourse between nations, as a result of improved methods of travel by land and water, has created a demand among the less advanced peoples for those things in the way of clothing and other products which seem to be associated with civilized communities. Millions of people who formerly never wore clothing at all, and greater millions that never wore a shoe, are now buying the materials for clothing and the shoes supplied by nations like Great Britain, the United States and Germany. The improved condition of the working classes in the leading nations, as a result of higher wages, has increased per capita consumption of the various products entering into their daily life. Increased manufacturing output implies an increase of demand for raw materials, and for the food supplies by the millons of workers in mine and factory.

Discovery and invention have brought into use many products that were unknown or very little used fifty years ago. Take India rubber for an example. The need of it in the manufacture of tires for automobiles has almost exhausted the supply, notwithstanding the steadily increasing quantity obtained from the rubber producing countries. This demand for rubber will continue to increase for many years the export trade of Brazil and other South American countries and of Ceylon and other eastern countries. The increased per capita consumption of sugar, tea and coffee acts in the same way, and the probability is that foreign trade will continue to increase as long as the wants, real or supposed, of humanity, increase. The only circumstance that can prevent it is long continued war between leading nations. For, notwithstanding that war temporarily increases the demand for certain products, it nevertheless exhausts the purchasing power of a community, and in the long run results in loss to both the conqueror and the conquered.

The charts give the value of the imports and exports of the leading nations during 1911. As has been the case for many years, one-half of all the trade of the world is made up of that of five nations—Great Britain, Germany, United States, France and Holland. The values given for Turkey and the Straits Settlements are for 1910, and that for the Dutch East Indies is for 1909, the statistics of these countries for 1911 not being available. As far as possible only the imports for consumption and the exports of domestic products are included. The tables compare the values of the imports and exports of the countries named for 1911 and 1901. They give the actual increase of values in the ten years and the pecrentage of increase for each nation.

COMPARISON OF THE IMPORT TRADE OF THE WORLD.

	1911	1901	Increase.	Per cent. of Increase
	—Millions of Dollars—			
United kingdom ...	2812·0	2210·1	601·9	27·2
Germany	2309·7	1290·2	1019·5	79·2
France	1575·0	843·2	731·8	86·8
United States ...	1533·0	880·4	652·6	74·1
Netherlands ...	1339·9	805·4	534·5	66·3
Belgium	800·9	428·6	392·3	91·5
Italy	648·1	331·6	316·5	95·1
Austria-Hungary ...	647·9	335·4	312·5	93·2
Russia in Europe ...	526·6	305·6	221·0	72·3
Canada	502·6	196·4	306·2	155·9
India	445·6	264·7	180·9	68·3
Argentina ...	353·9	109·9	244·0	220·0
Switzerland ..	347·8	202·6	145·2	71·6
Australia	325·3	206·5	118·8	57·5
China	306·8	190·2	116·6	61·3
Brazil	257·4	96·1	161·3	167·8
Japan	255·8	127·2	128·6	101·1
Straits Settlements	196·3	144·7	51·6	35·6
Spain	191·8	125 7	66·1	52·6
Sweden	180·2	123·1	57·1	46·4
South Africa ...	177 3	...	...	...
Denmark	167·0	106·3	60·7	57·1
Turkey	147·2	118·1	29·1	24·6
Egypt	136·1	75·1	61·0	81·2
Chile	127·3	50·8	76·5	150·6
Norway	125·0	76·9	48·1	62·4
Cuba	113·0	66·2	46·8	70·7
Algeria	110·2	61·4	48·8	79·5
Dutch East Indies	...	92·1	..	...
Mexico	95·1	66·2	28.9	43.7
New Zealand ...	95·0	55·2	38.8	70.3

COMPARISON OF THE EXPORT TRADE OF THE WORLD.

	1911	1901	Increase	Per Cent of Increase
	—Millions of Dollars—			
United Kingdom ...	2210·7	1362·7	848·0	62·2
United States ...	2058·4	1438 0	620·0	43·1
Germany	1928·4	1054·6	873·8	82·9
France	1191·2	774·4	416·8	53·8
Netherlands ...	1098·4	695·7	402·7	57.9
Ru[illegible]	779·5	392·2	387·3	98.7
[illegible]	706.0	393.2	312·8	79·5
B[illegible]n	640.7	352.8	287·9	81·0
A[illegible] Hungary	488.0	382.7	105·3	27·5
It[illegible]	418.6	265·2	153·4	57·8
A[illegible]a	370.9	323·3	138·6	59·6
J[illegible]	325.2	197.1	128·1	65·0
[illegible]a ...	313.3	161.8	151·5	93·6
[illegible]	279.4	196.0	83·4	42·5
[illegible]ica ...	278.8	...	...	...
[illegible]	245.5	120.2	125·3	104·2
[illegible]d ...	242.6	161.4	81·2	50·3
[illegible]	222.8	124.2	98.6	79·3
[illegible] Indies	...	95·1	...	...
[illegible]lements	174.4	114·4	60.0	52·5
[illegible] ...	170.7	102.6	71.1	69.3
[illegible] ...	173.3	94.7	78.6	83·0
[illegible] ...	147.0	75.3	71.7	93·9
[illegible] ...	142.9	79·8	63·1	79·1
[illegible] ...	142.7	78.2	64.5	82·2
[illegible] ...	123.8	62.7	61.1	97·4
[illegible] ...	122.9	64.2	58.7	91·3
[illegible] ...	98.3	50.5	47.8	94·6
[illegible] ...	92.5	53.7	38.8	72·2
[illegible] ...	80,0	69.7	10,3	14·8

The countries in which the value of the imports has increased more than 100 million dollars during the last ten years are as follows: Germany, $1,019,000,000; France, $731,000.000; United States, $652,000,000; United Kindom, $601,000,000; Holland, $534,000,000; Belgium, $392,000,000; Italy, $316,000,000; Austria-Hungary, $312.000,000; Canada, $306,000,000; Argentina, $244,000,000; Russila $221,000,000; India, $180,000,000; Brazil; $161,000000; Switzerland, $148,000,000, Japan, $128,000,000; Australia, $118,000,000, and China $116,000,000.

From the table of imports it will be seen that the greatest increases are in the large manufacturing nations, Germany far exceeding all others, followed by France, the United States, and the United Kingdom.

If the percentage of increase in the import trade of the various nations is considered, those having the largest rates are as follows: Argentina, 222 per cent.; Brazil, 167 per cent.; Canada, 155 per cent.; Chile, 150 per cent.; Japan, 101 per cent.; Italy, 95 per cent.; Austia Hungary, 93 per cent.; Belgium, 91 per cent.; France, 86 per cent.; Egypt, 81 per cent.; Algeria, 79 per cent.; Germany, 79 per cent.; United States, 74 per cent.; Switzerland, 71 per cent. It will thus be seen that Argentina imported in 1911 over three times as much as in 1901; Brazil, Canada and Chile, over two and one-half times, and Japan, over twice as much. The great manufacturing nations do not rank high; the United Kingdom only increased its imports 27 per cent., while neither France, Germany nor the United, States doubled the value in the last ten years.

The table of the export trade shows that the countries increasing more than 80 million dollars from 1901 to 1911 are: Germany, $873,000,000; United Kingdom, $848,000,000; United States, $620,000,000; France, $416,000,000; Holland, $402,000,000; Russia, $387,000,000; India, $312,000,000; Beglium, $287,000,000; Italy, $153,000,000; Australia, $138,000.000; Brazil, $128,000,000; China, $125,000,000; Japan, $98,000,000; Canada, $83,000,000.

Here again Germany leads all other nations in the increased value of its exports, succeeded by the United Kingdom and the Uuited States. In 1901 the United States exceeded all other nations in the value of its exports; in 1911 the United Kingdom ranked first in the value of exports, exceeding that of the United States by $150, 000,000.

The percentages of increase have also been greater among some of the non-manufacturing nations than among those largely engaged in manufacture, as can be seen from the following; China, 104 per cent; Russia, 98 per cent; Chile, 97 per cent; Algeria, 94 per cent; Mexico, 93 per cent; Argentina, 93 per cent; Cuba, 91 per cent; Sweden, 83 per cent; Germany, 82 per cent; Denmark, 82 per cent; India, 79 per cent; Japan, 79 per cent; Egypt, 79 per cent; New Zealand, 72 per cent. Germany is the only manufacturing nation that increased its exports over 75 per cent. during the last ten years.

Germany has increased not only the value of both imports and exports more than either of its rivals—the United Kingdom and the United States—but it has also made a greater percentage of increase of trade than either of them. In this connection it may be interesting to see in what classes of goods these increases of the last decade have occurred, and also the reason the United States has fallen behind so much in the matter of exports. Dividing all exports into three classes—food products, raw materials and manufactured products—the following results are obtained, the increase being indicated by "plus" and the decrease by "minus."

	Food products	Raw materials	Manufactured products
Uuited Kingdom ...	+ 67	+ 81	+ 676
United States ...	—168	+ 277	+ 323
Germany ...	+ 82	+ 224	+ 567

From the above it will be seen that the greatest increase in each of these nations has been in the exports of manufactured products. With the exception of food products from the United States there has been no decrease. The decrease in the exports of food products from the United States is due to the fact that the manufacturing industries of the United State are increasing so rapidly that the farmers of the country cannot raise enough food to supply their wants and continue to export the large quantities of wheat, corn, flour and meat products which they did formerly. This decrease in the exports of food products might be said to be a discouraging feature of the trade of the United States. When the enormous increase of the value of the exports of manufactured products is considered it would seem to be encouraging rather than dsicouraging, for while the United Kingdom has increased its exports of manufactured goods 62 per cent and Germany, 82 per cent, the United States has increased its exports of these products, 117 per cent.

Openings for Business.

[For particulars, address the Director-General of Commercial Intelligence, New Imperial Secretariat, 1, Council House Street, Calcutta, mentioning the *Wealth of India*. Firms that may like to follow up any enquiry should give proper references and restrict themselves to those enquiries only which they are fully and seriously qualified to handle.]

GROUNDNUT OIL.

A trader in Trieste, Austria, is desirous of communicating with shippers of groundnut oil. (B259)

OIL CAKES.

A trader in Trieste, Austria, is desir[illegible] of communicating with shippers of oil [illegible]s. (B260)

HARDWARE.

A firm in Antwerp is desirous of app[illegible] agents in Bengal for the sale of ir[illegible] steel material such as joists, channe[illegible] sheets, hoops, etc. (B261)

SECOND-HAND CLOTHING.

A London exporter of second-han[illegible] (uniform and civilian) is desirous [illegible] ponding with buyers. (B262)

HIDES AND LINSEED.

A firm in Trieste, Austria, is [illegible] communicating with sellers of [illegible] linseed. (B263)

The Economic World.

The Agriculturist in India.

IN the *Hindustan Review* for April, Mr. Mukut Behari Lal Bhargava, B.A., has an article on Agriculture in India. "India is, from an agricultural point of view, an old country and the inevitable law of the 'Diminishing Returns' has been in force for a considerable time past. Every increase of capital and labour to this industry brings a proportionately much smaller return. Any remedy that can be suggested for stopping or at least retarding this exhaustion of the productive power of the soil can be only temporary. Introduction of electricity and steam, employment of scientific irrigators and other tools, or of richer manures, &c., may for some time yield constant or even increasing return to every additional dose of capital and labour but after a time the law of 'diminishing' returns is bound to set in again." Agriculture is an industry which is largely dependent on wind and weather and other natural causes beyond human control. Therefore failure of crops and consequent distress is inevitable among the people of India. The best remedy for this state of things is, in Mr. Bhargava's opinion, the gradual replacement of agriculture by manufactures and industries. Meanwhile the agriculturist's position may be largely improved if the State will moderate its demand on the land by making permanent settlements or extending the terms of settlements. The Government may also relieve the ryot from indebtedness by making liberal advances of takkavi recoverable in easy instalments. A better solution of the problem is the establishment of village land banks and co-operative credit societies. Such banks and societies serve a two-fold purpose. Firstly, they enable the peasants to borrow money at low rates of interest, and, secondly, they discourage the ryot's tendency to borrow imprudently and spend the loan on unproductive purposes. Another step towards the improvement of the peasant's condition is the provision of increased irrigation facilities. These are the helps which are required of the Government and the people. The ryot also should exert himself to improve his condition. He must cut down his extravagance on occasions of birth, death and marriage in his family. Lastly, want of education and the poverty of the agriculturists act and react upon each other. The only solution to remove ignorance is compulsory primary education.

The Unrest of Transition.

Mr. A. J. Fraser Blair, late Editor of the *Empire*, has an article in the April number of the *Calcutta Review* dealing with the 'Economic Danger of Transition.' Mr. Blair devotes several paragraphs to the economic depression which has overtaken the middle classes in Bengal, and expresses the opinion that the phenomenon is common to all Eastern countries with any pretence to civilization. His views may be summarised as follows :—

The unrest in India will increase rather than diminish, because it is very largely economic, and as such is common to practically all Eastern countries with any civilization to boast of. So far as its economic occasion is concerned, it is due to the clashing of an advanced material civilization with a primitive material civilization. One of these must give way to the other —must either adopt its standards or perish, owing to the incompatibility of the ideals which have been set up. It is reasonable to suppose that the more advanced civilization will prove stronger than the more primitive civilization and all the signs point to the triumph of the former in India as in other countries.

The triumph of Western civilization over Eastern civilization will tend to leaven up the material standard of the whole human race and

give mankind a uniform economic basis. Its ultimate effect will, therefore, be presumably beneficial; but before this object can be realized, the world must pass through an agony of economic and, possibly, political change. It is quite conceivable that modern civilization itself may collapse under the ordeal as other civilizations have done.

"We are entering on such a period of economic readjustment in India. It is inevitable that economic revolution must lead to political change, but it will be absolutely fatal if the economic and the political crises are suffered to coincide. It will be, possibly, in the near future, the anxious task of Indian statesmanship to tide this country over the economic ordeal, and it can only succeed in this task by co-ordinating all those forces, both English and Indian, which make for orderly progress. Of these forces the anglicised Indian is by far the most important; it is vital that his interests should be absolutely indentified with those of the Government and the civilization which is as rightfully his inheritance as our own."

Economic Condition of Mysore.

From a note compiled by Mr. Alfred Chatterton, C.I.E., on the external trade of Mysore during the ten years 1901-11, it appears that notwithstanding the apparent financial prosperity of the State, the Government have not a whit too soon taken action in fostering and developing the industrial resources of the State. The general result of the survey, Mr. Chatterton says, is "that Mysore is at best in a stationary condition—the stronger term "stagnant" might almost be employed, save that there is evidence of internal changes. Those, however, tending to an improved condition of things are being neutralised by decadence and failure in others."

He draws up an average yearly balance sheet which, he contends, proves that approximately nearly Rs. 100 lakhs a year is lost through the inability of the people of Mysore to manage their own affairs, and represents to a large extent the profit of the Marwari capitalists who finance the trade and commerce of Mysore. It is beyond the scope of his review, Mr. Chatterton says, to suggest remedial measures. Nevertheless he does make a suggestion. The improvement of finance, he says, is a crying need, and the steady growth of co-operative credit is a step in the right direction; but the establishment of a strong local Bank is urgently called for. The State balances, amounting to large sums of money, are invested at less than 4 per cent., while its subjects have to pay anything varying from 12 per cent. to 36 per cent. for accommodation to carry on agriculture and trade. Through the agency of a local Bank the Government could place some of their locked-up resources at the disposal of their subjects, and not only would the actual assistance directly rendered be of value, but it would encourage private effort in the same direction. To what, Mr. Chatterton asks in conclusion, is due the stagnation apparent on all sides, and only partially counteracted by the influence of an active and energetic Government? Plague, which has more or less ravaged Mysore during the greater part of the ten years which this review covers, may have had something to do with it, but not everything. The character of the people has had some influence on the position, and the establishment of the Mysore Economic Conference by H.H. the Maharajah is a practical recognition by the head of the State that measures must be taken, and speedily, to stimulate the people to the necessity for greater activity if they are not gradually to recede from the pre-eminent position they have hitherto occupied in India as citizens of the "Model Native State."

The Agricultural Economy of Japan.

In respect of agricultural economy, there are several points of resemblance between India and Japan. As in India, the bulk of the population of Japan is agricultural. 60 per cent. of the people there are rural, consequently the average size of the farm for a family of 4 to 7 members is about 2½ acres. The area under cultivation is mostly devoted

to the cultivation of cereals such as rice and barley and other important staples. The system of tillage is still primitive and the work is mostly done by the hand. Farmers do not purchase efficient modern implements as they are too expensive and might not pay. 'Spade Farming' is an apt designation of the system in vogue in that country. These facts are gathered from an article which has been contributed by Dr. Yokoi, Professor of Agricultural Science, at the Imperial University of Tokyo to the March number of the *Bulletin of Agricultural Intelligence*. Summing up, the Professor observes :—

"We conclude that the area under cultivation in this country, even in the densely populated parts, is comparatively smaller than in any other old country. This is due principally to the mountainous nature of the country which reduces the arable area. The minute division of the land hinders the use of efficient agricultural implements; and the little attention paid to the raising of domestic animals makes much of the hilly land of no use.

"The greater part of the farmers who cultivate paddy fields only are not provided with land enough to occupy their time when two crops are raised on the same rice field, as in the warmer portions of the country. The busy time is limited to two periods of the year, and the cultivators have the rest of their time at their disposal. In those places where these is no rice-land, or where dry fields predominate, the farmers have their time better occupied in their work than is the case with the cultivators of rice fields only. The holders of dry upland fields must get their living in part by engaging in the cultivation of industrial plants or other special crops; for the cultivation of cereals alone, with the exception of rice, is not sufficient for the support of their families. Thus, we are disposed to believe that the best form of land holding for a farmer is a combination of wet and dry land in such degree that his labour can be used to the best advantage. Peasants who have not sufficient land to work for themselves must naturally engage in day labour or must get their living by occupying themselves in minor industries." Poultry-farming, fish-raising, sericulture, rope and sandals making with rice straw, the plaiting of barley straw into braid for the manufacture of hats, weaving, paper-making, silk-reeling, the weaving of matting, plaiting of chip braids, basket work, and wood working, these are the minor industries, in which the agricultural population find occupation for their leisure time. These industries should, of course, be studied and watched by parties interested in rural economy in India as well.

The High Prices Enquiry.

While the report of the Indian Prices Enquiry Committee is pending, a representative of the *Madras Times* interviewed Mr. K. L. Datta of that Commission, who has been posted as the Accountant-General, Madras.

The world-wide unrest, caused by the prevalence of high prices, naturally formed the first topic referred to, and after touching on the manner in which all nations were affected thereby, Mr. Datta said: "Prices have undoubtedly risen all over the world, but in India, prices have risen to a proportionately larger extent, than in any other country, with the possible exception of Japan." "I have not been able to get any definite statistics of Japan," he continued, "but, as far as I could gather, prices there have risen to a greater extent than in India. With that single exception, prices have risen at a greater rate in India than in any other country." At the same time, Mr. Datta observed that prices have risen least in this Presideney than in any other portion of India.

This rise in prices has not been without its compensation for the larger portion of the inhabitants of India. The ryots, agricultural labourers, and others connected with agriculture, have, in the opinion of Mr. Datta, shared in the increased revenue derived therefrom. The wages of the agricultural labourers have risen considerably, a result which has been partly contributed to by the shortage of labour, especially in the districts where cultivation is extending, and where the establishment of

industrial concerns, offering the labourers continuous employment at fair wages, as against the spasmodic employment afforded by agriculture, is increasing. Mr. Datta, however, did not think that the effect of this shortage of labour was a very potent factor in raising prices. The number affected, he affirmed, was comparatively small in proportion to the total employed. Nor did the emigration of labourers, of which we hear so much in this Presidency, affect prices to any appreciable extent. "The test as to whether the shortage was really great or of any importance," said Mr. Datta, "would be its effect in driving land out of cultivation. So far, no land has been driven out of cultivation for this reason; on the contrary cultivation is being rapidly extended, so that it is apparent, that the labour shortage was not a serious factor, and is more apparent than real."

It has often been said that the extension of cotton growing in this country was having the effect of reducing the area devoted to food products, and this in turn was greatly influencing the rising prices. Mr. Datta, however, did not subscribe to this view. "The area under cotton, it must be remembered, is comparatively small in comparison to the total cultivated area of the country," he said. Neither the increased acreage under cotton nor the growth of exports, which is frequently accused of raising the price of food is, in Mr. Datta's opinion, the reason for the increase in prices. "The real reason," he says, "is that the price now is a world price, instead of a local price as formerly. The spread of means of intercommunication, steamships and railways, etc., whereby the produce of one country can quickly be transported to another, should prices rule more favourably in that other, has brought about the existence of what is practically a universal price. With the introduction of the electric telegraph, buyers and sellers can obtain information as to the prices of commodities in all parts of the world and are able to buy or sell wherever the greatest advantage offers, irrespective of distance." For this reason, world factors, such as the demand and price in every country, have played a more important part in raising prices than local factors, that is local demand, labour difficulties, etc., and prices tend to rule level, comparatively speaking, in every part of the world."

Other causes touched on by Mr. Datta were the great increases which had taken place in house-rent in our large towns and cities and the higher standard of living now as compared with that of former times, an improvement which, he said, was apparent all over India.

Land Revenue Settlements.

At the Madras Provincial Conference held this month at Trichinopoly, the Hon'ble Mr. Chidambaranatha Mudaliar moved a resolution, praying that the land revenue on ryotwari holdings should be permanently settled, and that if there should be a revision of assessment, it should be only once in sixty years and that there should be no enhancement except on the ground of a substantial rise in prices, such enhancement not exceeding $12\frac{1}{2}$ per cent. and that these principles should be embodied in a legislative enactment. The mover pointed out that the cost of cultivation was growing heavier and heavier, and that there were many points which went in favour of the landowner and were against the position taken by Government in the matter. The standard of prices and the rise in prices were often unsafe tests and several inaccuracies arise to endanger and to positively make worse the situation of the landholder in the revision of the assessment.

The Resolution having been seconded, Mr. K. R. Subramania Sastri, B.A., B.L., moved an amendment that the alternative in the resolution asking for a revision of settlement once in sixty years be removed. He said that the extension of the period of revision from thirty to sixty years was not going to alleviate the miseries of the people. As practical men of the world, the conference should ask for the highest and leave the Government to give what they liked. In all civilised forms of Government, the taxation upon various classes

of industries and enterprises should bear a certain proportion. Considering the incidence of taxation on incomes, there was a great disparity between the incidence of income-tax and land revenue. Mr. Sadhu Ganapati seconded the amendment in an impassioned speech and said that the amendment related to a vital matter and there should be no hesitation in accepting it as it touches the welfare of large sections of the Indian population.

The Hon'ble Rao Bahadur V. K. Ramanuja-Chariar, who next spoke said that great mischief arose out of the power reserved to Government to revise the assessment once in thirty years and yet there was no harm in putting the alternative request in resolution.

The Hon'ble Mr. Seshagiri Iyer opposed the amendment and said that with permanent settlement, Government might require payment in kind and not in cash. Would that be profitable to landholders? Certainly not in his opinion. He said that the question should be considered from the point of view of Government Finance and no impediments should be placed in Government's finding revenue to meet the growing expenditure on account of education, sanitation, etc.

Mr. S. K. Sarma who followed the Hon'ble Mr. Seshagiri Iyer, in supporting the amendment, pointed out that rise in prices ought not to be the criterion of taxation.

Dewan Bahadur L. A. Govindaraghava Iyer, in opposing the amendment, pointed out in Tamil that there were two alternatives before them. They were asked to request for permanent settlement or revision only in 60 years. As regards permanent settlement itself, the Government had conclusively said they would not grant it. Considering that attitude of Government, was it not wiser to have an alternative? He for one, would be for the proposition itself. As regards others, he left them to choose whether they would have permanent settlement with the least chance of getting it or that and another alternative which had a better chance of being granted.

The Hon'ble Mr. Chidambranatha Mudaliar in reply pointed out that in the revision system there was provision for remission, but in permanent settlement there was no such thing. Moreover, one could not with certainty say that prices would always be on the increase. It may be that they might go down, and in that case, they would profit by revision.

Before putting the amendment to vote, the President observed that the first request in that resolution was for permanent settlement. The second was a prayer that the settlement should be revised only once in 60 years. He did not think that Mr. Subramania Sastri would say that an alternative prayer in a plaint could weaken the case. That was exactly the way in which the resolution had been framed. They had put forward the fact that they were asking for a permanent settlement and an alternative for revision in 60 years if that could not be granted. The discussion as to the merits of the permanent settlement is one which has already been dealt with on several occasions. He did not think that they should insist on the deletion of those words. The Hon'ble Mr. Ramanuja Chariar who had been very ardent in this matter did not support it. The Hon'ble gentleman was too practical to lose sight of the fact, that half a loaf was better than no bread.

The amendment was put to the vote and lost, the original proposition being carried.

Bombay Wage Census.

The Bombay Government recently issued a *communique* on the Wage Census of the Bombay Presidency (including Sind) taken in August 1911, stating this was the first regular wage census and was taken in accordance with the scheme approved by Government resolution, dated the 21st April, 1911. The idea of taking a wage census originated in the United Provinces. The main object of the scheme was to ascertain the standard rates of wages in each district or homogeneous tract, and to provide material for the observation of permnent changes in these standard rates, neglecting period fluctuations. The census

was divided into two classes, urban and rural.

The variation in wages of skilled urban labour is remarkable and is to be attributed to the varying skill of the workers included in one class. In fact, there is no standard for skilled labour. Some reporters have included under unskilled labour men earning Rs. 50 per mensem, but this must be attributed to faulty description.

In Bombay unskilled labour is paid monthly wages of Rs. 10 to Rs. 18 and consists mostly of mill-hands, some of whom are located free of charge in quarters built for them. Day labour is paid annas six to eight per day or annas ten to twelve for selected men; sometimes as much as Re. 1-2-0 is paid. Other towns except those in Sind, show lower rates than Bombay. There is a general complaint as to a rise of at least 25 per cent in the rate of wages during the last five years. The rise is attributed to plague and the higher price of foodstuffs. In the Presidency, eleven to thirteen hours with a recess of half an hour constitute a working day for mill hands and eight to ten hours for other labourers. In Karachi, working hours range between eight to twelve hours and elsewhere in Sind from eight to eight and-a-half.

Of skilled labourers, blacksmiths generally earn their living by piecework and the rest are paid daily or monthly wages. A fitter may get from Rs. 65 to Rs. 220 a month in railway workshops at Bhusaval and the difference is as varied elsewhere. Similar variations are reported for other classes of skilled labour. Thus in Bombay, firemen get monthly wages ranging from Rs. 15 to 60, carpenters from Rs. 15 to 75. The pay of masons appears to vary least. The hours of work for skilled labour vary from seven to twelve per diem.

Workers in iron and hardware work generally on their own account, and only a few rates have been reported from Bombay and elsewhere where they work in factories. In special cases they receive Rs. 71 to Rs. 100 a month. Working hours vary from eight to ten. The same remark applies to workers in brass, copper and bell metal. In special cases they receive from Rs. 2½ to 4 per day. No rates have been returned for cotton weavers. They generally receive advances either in cash or kind (yarn) and repay them by sale of cloth.

Of village artisans, the carpenter usually receives an allowance at harvest time from each cultivator for customary work, but occasionally he works for daily wages. Supplements to cash payment seem fairly common in the shape of meals, tobacco or fuel.

The same remarks apply to the blacksmith. For jobs other than customary agricultural ones special charges are made. The rates quoted represent their average daily earnings.

Farm servants are engaged usually by the year and receive Rs. 20 to 50 per annum with free board and lodging and clothing worth Rs. 4 to 12. When a cash payment alone is given, they get Rs. 60 to 100 per annum, and the monthly rates have been worked out accordingly. In North and South Gujarat the above supplements to cash payments are common, and sometimes a share of the produce at harvest or material to build a hut are given, or a small plot of land from half to one acre at a reduced rent; but in such cases the purely cash wage of Rs. 6 to 8 per month is reduced accordingly. In North Deccan clothing worth Rs. 3 to 5 per annum is given in addition to the usual wage of Rs. 5 to 8 per mensem. The value of free quarters is estimated to be annas 4 to 8 per month. Both in North and East Deccan food is substituted occasionally for part of the cash wage. Where food is given, clothing is also provided.

It is believed that the figures given are accurate. The returns sent in as a check on the work of Circle Inspectors generally confirm the accuracy of the work done by the Land Records Staff. Reports from Divisional Inspectors of Agriculture and private persons called for with a view to obtain some idea of alterations in the condition of the labour market within the last five or ten years are unanimous in the

conclusion that the rates of wages in town and country have risen about 25 per cent. The unskilled labourer is reported to be more independent owing to the ready demand for his services and less amenable to control. The number of hours worked has decreased and labourers are said to be very unpunctual in their attendance especially in the morning. On Government Farms, where regular hours are kept, higher wages have to be given. The quality of the work done by artisans and by farm labourers from whom skill is required is stated to be much inferior to what it was ten years ago. A deterioration in the cultivation of land is reported to have resulted. The reasons given for this state of affairs are the prevalence of plague, the extension of ginning factories and mills, and the carrying out of immense undertakings, such as the Bombay Docks, Railway extensions, and the Tata Hydro-Electric Works, but the rise in the price of foodstuffs is largely responsible for the rise in wages.

The Rising Cost of Living.

Mr. David Starr Jordan, President, Leland Stanford University, writes in the *Expositor* as follows :—

The rise in cost of articles of necessity began about 1897. It is world-wide, a little greater in high tariff countries, because of the shelter and leverage offered by protection. In general, this rise is forty to fifty per cent. ; the fall in the purchasing power of gold from twenty-five to forty. It is enhanced and aggravated in different countries by special conditions. Of these, several have been described in the United States, and others in other nations. These elements are not causes of the rising cost of living, but modifying circumstances. According to Sauerbeck, the "Englishman's dollar" of 1897 is now worth seventy-eight cents, the American dollar but seventy. Of actual causes, three may be recognized.

(1) The great increase in the world's stock of gold (from about \$7,500,000,000 to about \$11,000,000,000). This increase has now passed its climax. As the amount of gold at the best is very small for the credit resting on it, the bonded debt of civilized countries exceeding \$60,000,000,000, it is believed that the importance of this factor is greatly exaggerated. It is, however, an element of unknown force in determining the value of gold as stated in terms of other products of labor and capital.

(2) The cheapening of the process by which gold is extracted and the consequent cheapening of gold as measured in terms of labor. The cyanide process has made it profitable to work low grade ores and old dumps, and a new dollar obtained from a gold mine costs in labor and capital much less than the old dollars cost. Whatever value may be assigned to this factor, its influence is long since spent. It is not likely that the gold market will be soon disturbed again by new discoveries of mines or by new processes.

(3) The increase of taxation the world over, due to (1) the waste of actual war, (2) the extension of armies and navies, and (3) the increase by one hundred to two hundred per cent. of municipal and other indebtedness of the world. "Instead of living beyond our means, we are living beyond the means of the fourth generation."

Roughly speaking, the taxes of the world have been doubled since 1897, and supported by these additional taxes, millions of men have been drawn from productive labor. In 1911 the bonded debt of the world for past expenditures (pawn checks for wars already fought) amounted to \$37,000,000,000. The annual interest charges on this was over \$1,400,000,000 The annual naval expenses of the seven most "progressive," that is, most wasteful nations, rose from about \$250,000,000 in 1897, to \$629,000,000 in 1911. The total military expenses of these same nations doubled in this time, with a corresponding withdrawal of men from industry to militarism. Meanwhile, municipal and other local debts everywhere are two or three times as great as in 1897. For example, San Francisco had in 1902 a budget of \$6,500,000 annually. For 1913 this budget

is $15,000,000. The valuation of city property was in 1902, $418,000,000. It is now $510,000,000. It is estimated that in 1921 the valuation will be $753,000,000, the tax $27,000,000. The bonded debt of British cities rose from $1,500,000,000 in 1897 to $3,800,000,000 in 1912. A similar increase is seen in Germany and France. In the United States the total of state and local taxes has risen from $1,090,000,000 in 1901 to $2,505,000,000 in 1911. The fact that these sums are raised by indirect taxation makes the burden the greater. It must be paid in the increased prices of commodities, in other words, by a rising cost of living. All taxes, however levied, constitute a confiscation of private property for public purposes. In all cases the dealer, accustomed to a certain percentage of profit, adds his tax burden to this percentage. In doing so, he must lower his purchase price or raise his selling price. Which he does or can do depends on the relative power of resistance of producer, dealer and consumer. The stress and incidence of taxation falls on the less resistent elements. Any one of the three groups may combine to throw off this stress. The dealers are more often successful in this. As production is more or less limited, the consumer is the weakest of the three groups, and finally bears most of the burden. Some part of the consuming group being also producers, may roll the burden back, but it is in any case a burden on the people and they can only shift it among themselves. There is no foreigner they can plunder to make their losses good. As each dollar must bear the tax burden its value is diminished. Taxation lowers the purchasing power of money. As the purchasing power is likely to fall in the future, the rate of interest rises. Bonds will be paid in still cheaper dollars in the future.

In this connection it may be noted that the price of stable and staple commodities is fixed in London. Exports have in general in New York, the London value *minus* the cost of handling; imports, the London value with the addition of the cost of handling and the tax on imports. The value of non-exportable or perishable goods depends on local conditions, and is subject to much greater fluctuations Thus potatoes are now very dear in California, and onions are excessively cheap. I am a dealer, let us say, in Palo Alto. I allow a margin of fifteen per cent. gross profit on my dealings. I have some taxable property and I feed my family. My taxes direct and indirect amount to $500. With time my government, municipal, state and national raise this tax to $1,200. I must increase my profits by $700. I allow a margin of twenty-five per cent. Those from whom I buy have raised their margin also. They were obliged to do so to make both ends meet. I find that I cannot sell on a margin of twenty-five per cent. My competitors cut under my prices. We lose money. Then we form a secret or private combination to hold up the Palo Alto prices Our customers, largely professors, cannot increase their stipends. They find that a salary of $4,000 in 1912 is just equivalent to one of $2,840 in 1897. The cost of living has risen. The purchasing power of money has fallen. It has fallen because all consumption has been over-taxed. The United States has done her part in this, but all over the world from Osaka to Manchester, Buenos Aires, Palo Alto and Irkutsk, the same story is told with local variations. Steadily increasing taxation means steadily rising cost of living. The more you take away from the people the less they have left and the higher the price they will set on what is left, and the more unpleasant it is to be poor, because the man lowest down is the man who cannot set his own prices.

In this view, the primary factor in the rise of the cost of living is the fall in the purchasing power of gold due to the excessive and growing exactions of the governments of the world. In other words, it is produced by the steady encroachments of the government on the individual the world over, through the indirect tax and the deferred payment. Stated differently, the common man has too many mouths to feed, and it takes too much of his money to feed them. The cost of enforced idleness and male employment, the special result of militarism is greater even than the cost of powder, ships and guns. The long roll of those fed by tax increment steadily grows with the growth of the taxes that support them.

The Financial World.

Financing Railways in India.

It is understood that the question of financing railways in India will engage the attention of the Government of India during the present season. A substantial record of this year's railway allotment has been found from the cash balances but it is extremely doubtful whether Government will have any material cash balances to operate upon in a similar manner. Besides, the opium revenue is also disappearing and the condition of the London money market is anything but satisfactory. A reducible minimum of yearly programme of 15 crores for the next three years is absolutely essential for an appreciable development of the railway system. Ways and means will however have to be devised to raise this amount. It may likewise be borne in mind that with the 15 crores programme little or no new important construction can be taken in hand. Various suggestions made by Lord Inchcape's Committee for raising money in London for capital expenditure on railways will therefore have to be re-examined and the question of tapping the Indian market up to the extent of five crores annually will also merit consideration. In addition to the capital outlay on railways and irrigation, funds will also be required for financing the new capital at Delhi.

Indian Currency and Progress.

At a recent meeting of the East India Association Mr. Mark B. F. Major, delivered an address on "The relation of the currency to the social and economic progress of India." Sir George Paish occupied the chair.

Mr. Major said that in what he had to say he was merely expounding the views of the late Mr. Cecil Balfour Phipson, whose principles had been unduly neglected by his countrymen. In the main the lecturer's contention was that a currency based on the precious metals or on anything intrinsically valuable was wasteful, and in other ways undesirable. The duty of the Government was to issue valueless money tokens, so regulated that on an average of years each token should exchange for a fixed quantity of food. By stimulating the production of food surpluses, the Government would merely take the easiest and most effective means of increasing its own revenue without taxation. The Indian Government had already taken the first step towards securing such revenue by converting its barbaric currency of silver coins circulating at their market value as bullion into a semi-civilised currency of silver tokens circulating at a currency value one-third higher than their bullion value. But this revenue was acquired solely as an accidental accompaniment of an attempt more nearly to approximate the value of India's currency to that of a totally distinct and foreign currency unit, that of Great Britain, with which the former had no legitimate connection and to which it was disastrous to all its main economic interests, to be tied. The Chairman, referring to the suggested paper currency, warned his hearers against giving support to what he referred to as Mr. Major's heresies. There was, however, one thing the lecturer had said with which he thoroughly agreed, and that was that the variations of an unstable currency were injurious to the community. That was a thing against which the Government of India had always attempted to guard, with the result that they had adopted the gold standard. When the silver standard was in vogue the fluctuations of the rupee had been very great, and had had disastrous consequences to many investors in Indian securities. Since the adoption of the gold standard those fluctuations had been confined within the narrowest limits.

Bankers and Pass-books.

We gather from the *Economist* that a decision which seems to press rather unfairly on bankers was given by Mr. Justice Channell, in the case of Walker *v.* The Manchester Banking Company. Mr. Walker, a Solicitor, was Joint Trustee of a Marriage Settlement, and kept the account of the trust estate, which seems to have been managed by his clerk, with the defendant's bank. In March 1910, August 1911, and August 1912, this clerk forged cheques on this account for £250, £250, and £100, respectively, and got them cashed. It was only during the clerk's absence from the office through illness five months ago, that Mr. Walker discovered the fraud, and he then claimed a refund of the £600 from the bank. The law is that if a bank cashes a forged cheque it must bear the consequences of its mistake. But in this case the bank argued that it had been led to make the mistake through the conduct of its customer. The bank's counsel pleaded that the pass-book, which had been sent to Mr. Walker nine times since March, 1910, constituted an "account stated," and that by his negligence in not keeping the trust account and comparing it with the pass-book, he had caused the bank to honour the cheques. Mr. Justice Channell, in giving judgment for the plaintiff, said that he was only following the decision of Mr. Justice Bray in the Kepitigalla case (1909, 2 K.B., 1010). But does not the latest decision strain every point against the bank, for if the accounts of 1910 can thus be reopened, can a bank shareholder be sure that his dividends for the last three years were really earned. For bankers, the important point is this—has a customer any duty to examine his pass-book? In the Vagliano case (1891) Lord Halsbury obviously thought that he had, for he said, "Was not the customer bound to know the contents of his own pass-book?" The Kepitigalla case may be distinguished quite clearly from Mr. Justice Channell's decision. In that case, the forgeries only extended over two months, instead of two and-a-half years, and all within one quarter, so that there had been no regular balancing of the pass-book, merely a pencil addition. Both Sir J. Simon, who won his case, and Mr Justice Bray, appeared to lay stress on this fact, *i.e.*, that there was no formal half-yearly balancing. It is true that Mr Justice Channell expressly declined to hold that under no circumstance was there a duty on the customer to examine his pass-book, but he said that the authorities were rather against the banks. A correspondent suggests that the line might fairly be drawn as follows—during any one half-year a customer may easily fail to detect mistakes, but when the half-year is over, and he has presumably made up his own accounts, it should be assumed *prima facie* that he has examined and assented to the balances shown in his pass-book. Country banks usually send out a slip with the balance written on it, which they ask the customers to sign, and this practice might perhaps be adopted by all banks.

The Demand for a Higher Yield.

Mr. Fanklin Escher, the Financial Editor of the "*Harpers Weekly*" writing on the above subject in a recent number of the *Financial Review of Reviews* "says that five per cent. has come to take the place of four in regard to the income from prime securities expected by the investors. The effects of this development are many and varied. The first has been a decided change in the character of the securities being offered by the investment houses. Till very recently the offerings of the leading houses were confined to securities yielding around 4 per cent. But they are very different now. Among the offerings of the most conservative houses there are now to be found any number of securities netting upwards of 5 per cent. Nor is there any apology nowadays on the part of bankers offering their clients securities yielding that amount. With the demand for a higher yield, also, there has come about a very considerable change in the methods of distribution employed by the investment houses. Many, even of the oldest houses, have felt the sting of competition and

undertaken selling compaigns through highly trained forces of salesmen in quite an aggressive way. At the present day it is no uncommon thing for bankers and large private investors to receive offerings through the personal representatives of banking houses which, before this great change in the investment business developed, would have scorned to do business in any other way than across their own mahogany counters or in their own banking parlours.

A further result of the demand for a higher yield and the competition among investment dealers which it has brought about has been a determined renewal of efforts to open up a foreign market for American securities. There seems to be a well-defined idea among American investment dealers that the yield demanded by the European investor from his investments is very considerably less than that required in the United States. The foreign market is, therefore, looked upon by him as a most desirable field in which to distribute the bonds he is trying to place, and, in consequence, a number of American firms which have never before attempted to sell extensively in the European market have opened up foreign offices.

The second great effect of the demand for a higher yield has been the creation of a large volume of new securities, among which, there are a number improperly issued and so bound to result in loss. But the greater part of them are investment securities of good quality. Where a number of houses of international reputation formerly would have scorned to put out anything but high-grade bonds, we now find them selling extensively, for instance, Industrial Preferred stocks. The principal question, indeed, with regard to these new securities is not safety but rather market ability. In a great many cases banking houses putting out these new stocks and bonds are adopting the policy of "making a market" for them. A number of investment houses of the highest standing are now devoting themselves exclusively to the marketing of these issues and with a good deal of success. Investors will buy these securities where they refuse to buy anything else. Of even more importance than that is the fact that these securities of public utility corporations are exempt from the danger of Government interference and attack.

Far less favourable a feature than the issue of these public utility securities, has been the turning down a vast amount of short term notes-bonds bearing a high rate of interest and maturing in from 1 to 5 years. This is, says the writer, doubtless a make-shift form of financing resorted to by the corporations when unable to sell regular bonds. The effect of the issue of all these short-term notes is largely to divert bank-money into them at the expense of commercial borrowers.

The third great effect of the demand for a higher yield and the issue of this great mass of securities has, naturally, been to depress the price of existing investment. In America the effect has been most marked in the case of the highest grade of municipal and railway bonds—what are known as "savings bank securities." In England, probably the most conspicuous example of the effect of this influence is the decline in the price of Consols. In France the new low record made by Rentes is a manifestation of the same thing. A great deal of argument is heard to the effect that the decline in Government bonds of this class is due rather to political than economic considerations, but by all those familiar with the workings of the market it is recognised that the principal influence in bringing about the lower range of prices is, without question, the competition of new issues perfectly safe and yet yielding a higher rate of income.

A fourth important effect of the unwillingness on the part of investors to buy securities other than those yielding a high income has been to impose a serious strain on the business corporations whose necessities have forced them into the market for capital. For instance, the borrowing done by many large corporations enjoying very fair credit has cost

them a rate upwards of 9 per cent. It stands to reason that the payment of such rates of interest, particularly where the issues are bonds and the interest payments must continue over a long term of years, is a heavy drag upon the business of the corporation.

Faced with the necessity of paying such high rates, a good many big companies and corporations simply refuse to extend their operations even where expansion is thought to be necessary. In that way, concludes the writer, has the investor's demand for a higher yield, operated to impose a serious check on industry in general.

Revenue and Finance in India.

The "*Hindu*" writes :—With the close of the "Imperial Legislative Shop" after the Budget debates, Mr. D. E. Wacha, in an interesting article contributed to *Commerce and Co-operation*, made what he calls "the real stock-taking within doors" of Indian finance and deduces some very useful inferences as to its present position. With the present financial year will disappear the opium revenue, always a disturbing and uncertain factor in Indian finance and its place, so far as uncertainty is concerned, will be taken by the net gains on railway earnings, irrigation and other commercial services of the State. Mr. Wacha contends that the receipts, expenditure and profits from these commercial services of the State should not be lumped with the ordinary revenue receipts, expenditure and surplus or deficit, in as much as the former is a case of return on capital borrowed and invested, whereas the latter is a case of taxes levied and payable compulsorily by the people to meet the expenditure of the State in the discharge of its functions. This combination has tended, in his opinion, to obscure the real relation of the ordinary and non-commercial expenditure of the Government to the ordinary and non-commercial receipts of the State from taxes, fees, etc. There is no doubt that the present system of grouping all the receipts and expenditure in the Budget is unscientific and misleading, while the entries under Provincial finance, which Mr. Wacha properly calls as a mere adjusting entry, only makes the figures more confusing to the lay reader. There is no finance about Provincial Finance, says Mr. Wacha, "and it ought not to appear in the Budget itself, though in the statement of ways and means there may be this adjusting entry for purposes of accounts." Classifying these disturbing elements, Mr. Wacha exhibits the figures of the last Budget as follows :—

Revenue.		Million £.
Revenue proper (exclusive of opium)		50·238
Commercial Services—		
Net gain on Railways ...	4·552	
" Irrigation ...	·839	
		5·391
Other Services—		
Net Postal Receipts ...	0·303	
" Mint " ...	0·137	
	0·440	
Less Telegraphs ...	0·039	
		0·401
		56·031
Provincial Adjustments ...		2·912
		58·943
Opium ...		1·445
Total ...		60·388

Expenditure.	Million £.
Direct demands on Revenue ...	9·470
Interest (Net) ...	0·022
Civil Services Charges ...	18·128
Army Service Charges ...	19·646
Miscellaneous ...	4·498
Famine funds ...	1·000
Other Public Works ...	6·298
Total ...	59·062
Surplus ...	1·326
	60·388

Removing the disturbing elements, and taking the expenditure and revenue proper of the country, Mr. Wacha finds the Budget to work out as follows :—

Revenue.		Million £.
Revenue proper	...	50·238
Other Service net receipts	...	00·401
		50.639
Deficit	...	8·423
Total	...	59·062

Expenditure		Million £.
Direct Demands	...	9·470
Interest	...	0·022
Civil Charges	...	18·128
Army	...	19·646
Miscellaneous	...	4·498
Famine Fund	...	1·000
Other Public works	...	6·299
Total	...	59·062

"Our *true* Budget," Mr. Wacha concludes, "would thus show a deficit of 8·423 million pounds equivalent to 12·634 crore rupees. Even if we assume that opium on an average yields 1½ crore rupees, we shall have to face a deficit still of 11 crores! Thus, shorn of the net gain, derived not from taxation proper but from 'extraneous commercial services,' the annual Budget of the near future must be a Budget of deficit." The contrast may appear alarming to the superficial reader, but what Mr. Wacha means to emphasise is that ordinary expenditure is kept at a much higher level than the ordinary revenues warrant, and the risk of relaying on the *deus ex machina* that make surpluses or create deficits is great. The remedies for this state of things, he proposes to discuss subsequently. Mr. Wacha, however proceeds further in respect of the commercial services and makes a suggestion which seems to require further discussion. He wants that the profits from commercial services should be re-invested in the further development of the services, *viz.*, railways, irrigation, etc.; so that the burden of foreign indebtedness may be reduced thereby. While an increase of our "Home Charges" on this account is always to be deprecated and a reduction there of should always be urged and welcomed, we do not know whether the utilisation of revenue earnings for capital expenditure would always be justifiable. Indeed, the use of revenue surpluses for the railway programme has always been objected both in and outside the Imperial Council on behalf of the public. On principle, it seems to us that the State on behalf of the tax-payer can claim to share in the profits, for normal administrative expenditure when the tax-payer had always guaranteed the loans and had paid the deficits thereof for such a long services of years, as Mr. Wacha himself has often so well shown. It is true, at the same time, that earnings from commercial services should be treated on a different footing from Revenue receipts proper, especially as the uncertainty and risks of the former make them unsuitable for relying on them as one of the normal and stable resources of the State. Another aspect of the quasi-commercial transactions of the Government is referred to by Mr. Wacha in his condemnation of the 10 Rs. gold coin and the establishment of a State Bank, as to both of which he hopes public opinion will pronounce itself unmistakably.

England's Gold Reserve.

It is announced that a Committee of Bankers has been formed in London to consider the best means of increasing the national Gold Reserves. Viscount St. Alwyn is Chairman. It is a well known fact that London is the financial centre of the world and yet the Bank of England holds very little gold. That is why English bankers are so anxious to keep India out of the gold field. The following extract from an article which appeared some time ago in an English magazine explains the gravity of the situation which the committee of bankers will be required to meet by suitable proposals,

"An infinite number of strands binds all the great nations to one another, and, like the nerves of the human body, these strands radiate from the great nerve centres of credit.

The art of banking is to speculate with success on the chance that only a small proportion of creditors will ask for their money in gold at the same moment. But they *may* all demand it.

Gold must be always available somewhere. And it is always available, but only from one place in the world. London, alone among the great financial centres has undertaken the task of meeting every legitimate demand in gold at all times and to any amount. No other banking nation has ventured to face the risk of meeting not only the demands of its own depositors, but of the world itself. If Germany has to pay gold to Turkey for a loan newly granted, she gets it from London; if New York wants gold, she gets it from London; if the Argentine or Egypt or India have had good harvests and want gold, they get it from London.

She undertakes to supply on demand not only the countless depositors in her own bank, but the world at large. Anybody in the world who keeps money in London or can raise a credit or get an advance in London can get gold from the Bank of England.

The Bank of France holds gold to the amount of £128,000,000; the Bank of Russia, £125,000,000; the Reichsbank, £55,000,000; while the Bank of England, with world-wide liabilities, has only £35,000,000 lying in bullion or coin in the vaults of the Bank of England, together with the stock of metal held by other banks, in all, perhaps, £70,000,000. It is estimated that this sum is equal to not much more than six per cent. of the total deposits of the banks of the United Kingdom. While the stock scattered about among the different banks is a valuable standby, the final reserve is the reserve of the Bank of England. That is the reserve which all the banks in the United Kingdom fall back on. In 1907 America drew nearly £15,000,000 in two months from London.

The Bank of England's reserve fell over £6,000,000 in two weeks. There is no other nation which has ben able to undertake these tremendous responsibilities.

Since 1895 the world's gold has increased by £1,000,000,000. A great portion of this huge sum has passed through London, because London is a free market. Only £20,000,000 has stayed there.

What, then, is likely to happen on the outbreak of a war? Suppose, for instance, Germany declared war against us. A crisis in the Money Market would be at once precipitated.

Everybody would be seeking to place themselves in a position to meet their engagements. Money would dry up, and the Bank rate would be forced to a high figure. At the same time there would be a tremendous fall in value of all securities on the Stock Exchange, so great a fall that the Stock Exchange might even have to be closed, Banks would have to "carry" their customers who had borrowed against securities, and would find a large part of their assets unrealisable. The discount market *i.e.*, the bill market—would be no better off.

London finances Germany by means of acceptances to the extent probably of about £70,000,000 sterling at any one time. This means that accepting houses in London will have made themselves responsible during the two or three months after the outbreak of war for the payment, mainly to the Joint Stock Banks, of £70,000,000, against bills drawn on German account, which these banks and others will have bought in the discount market. But the accepting houses would only be in a position to pay the whole of this large sum if they receive, as they would in the ordinary course of affairs, the same amount from their German clients, to finance whose business the bills were drawn. It is quite probable that these clients would not or could not pay. It is probable that in any case, whether their money were received or not,

the discount market would be so hopelessly disorganised that a "moratorium" would have to be declared.

The whole credit system rests on the supply of banking currency. If this currency is withdrawn no one can meet his debts, because no one has the means to pay. The whole money market would be struck with paralysis. As Bagehot said, all that would be left would be a mass of failures and a bundle of securities. In any case the sudden stop of the discount machinery would cause incalculable damage and confusion to trade and enterprise through out the world. Everything would depend on the action of our foreign clients as a whole. If they took fright and demanded immediate payment in gold, London might have to put up her shutters as a free gold market, simply through lack of time to save herself by the realisation of some of her immense assets abroad.

London might never regain her place. Gold would flow in again, no doubt, to pay for the interest on our present investments, which amounts, to something like £180,000,000 per annum on a capital invested of £3,300,000,000 sterling. The most dangerous period, therefore, will be the few days or weeks after the declaration of war, or if it was quite clear war was inevitable the few days before that declaration, when our enemies might attempt to withdraw as much money as possible."

District Board Railways.

The following G.O. has been issued by the Madras Government :—

" The Government have recently had under their consideration the question of financing district board railways. As a result of their deliberations, they are of opinion that the most expeditious method will be to provide for the cost of construction by raising debenture capital rather than to depend mainly upon accumulations of railway cess for that purpose. They are advised that no sinking fund is absolutely necessary and that no difficulty is likely to be experienced in raising the money required by 4½ *per cent.* debentures redeemable only at the option of the district board. The rate of interest necessary has been examined with particular care and whatever may become feasible in the future, the Government are satisfied that in the initial stage nothing less than 4½ *per cent.* will suffice to attract capital.

It is intended that the accumulated railway cess should primarily be utilised to meet the cost of interest on capital during construction and the deficit, if any, in the net earnings of the railway until they suffice to meet the interest due upon the money borrowed for construction. Any surplus which may remain over, together with the further accumulations will be available for the purpose of financing additional branch lines. Where the railway operations of a particular district board prove financially successful, it should be possible ultimately to dispense with the levy of the special cess, but this is a step which cannot safely be taken at once and it is therefore advisable to continue the cess until practical experience has been gained of the working of the proposed scheme.

In view of the near prospect of a settlement of the vexed question of working terms, the Government are anxious, with as little delay as possible to formulate a definite financial policy and they desire to be placed in possession of the opinions of those district boards which have railway projects on hand or have actually imposed, or shortly propose to levy, the railway-cess. The presidents of the district boards concerned will accordingly be requested during the month of October to convene meetings for the purpose of considering the points in issue and to report the result to Government not later than the 5th November 1913."

In this connection, the following opinions regarding financing of railways in India will be read with interest.

The *Economist* writes :—

The benefits conferred on India by railway construction as an instrument of industrial and

agricultural development, and as a means of alleviating, by rapid distribution, the distress caused by drought and famine, cannot be overestimated But the total mileage at present working is grotesquely inadequate for the needs of the vast population, and every interest is being hampered in the path of progress by the need of further transport facilities. For 1912-13 the Indian Budget provides £9,000,000 for railway development and construction, and, although this sum is an increase on the grants of recent years, it still falls far short of the $12\frac{1}{2}$ millions sterling recommended by the Royal Commission of 1908 as the minimum annual requirement The policy of the Government has hitherto been to construct railroads up to the standard of the highest modern efficiency. This entails a very slow rate of construction. Would not the pressing economic needs be better met if the available funds were applied to a wider and more rapid construction of light railways, which could be improved gradually when the lines begin to pay their way?

The *United Empire* says :—

The unprogressive character of the Indian railway policy, of which there is so much complaint, is due to the fact that capitalists will not invest in Indian railways unless the Government will assist them, either with guarantees or subsidies in some form or other. Some will urge that the Government has obstructed private investment that is free of all Government authority, and that an alien despotism must naturally look with suspicion upon the intrusion of outside authorities—and this accusation has *prima facie* probability on its side. But it is doubtful whether it can be maintained. Up till forty years ago the Government was genuinely desirous of attracting free capital to India, and they made great efforts to do so, for the construction not only of railways but of canals. But it would not come. India is a poor country, and it is only of recent years that railways have become very profitable. And there is always a risk of the subversion of an alien Government. The main lines of railway are now paying well, but there is hardly any ground left vacant for the construction of main lines. The existing network has extended over all the cultivated valleys. Feeders remain, but they take time to pay and are not attractive to investors who have countries like Canada and Argentina open to them. So capital "clings to the cross" of State control and must not complain of it.

Thus the *Indian Daily News*—

Occasionally one hears of Indian capital being attracted to railways. If Lala Harikishan Lal, President of the Industrial Conference at Bankipore, is correct, the reason why Indians do not invest in railways is that the policy of the Government is not what it should be. While Government borrows at $3\frac{1}{2}$ per cent., Port Trust, Municipalities and Improvement Trusts get funds at 4 per cent.; the Post Office has received several crores of rupees at an interest of about 3 per cent. and the Banks deposits in India range from 3 to 6 per cent. maximum, according to the standing of the Banks, the question naturally arises why do not Railways attract Indian Capital when their earnings amount to 6 per cent., and over, with a guarantee, rebates up to 5 per cent. and with a clause of repurchase at 125 per cent. The truth is, that the portals of the Railway Board Offices are not open for free admission of Indians and the policy, whatever its worth on paper, is highly exclusive and restrictive. It is also a fact that the Indian Capitalist does not know that Railways can also be financed by him, and there are not organisations for helping popular investment in Indian Railways. That is Mr. Harkishen's view.

The Educational World.

Revival of Apprenticeship.

The Birmingham Chamber of Commerce has instituted an inquiry amongst local educationists and employers on the question of revivification of the system of apprenticeship. The difficulties of returning to the old system were recognized but it was apparent to the Commitee conducting the inquiry that something was needed to remedy the evils which now exist "owing to the manner in which boys, on leaving school, are put into *cul de sac* occupations simply because at the outset they receive higher wages than they would do in a position where it was possible for them to learn a trade." Sir George H. Kenrich, Chairman of the City Education Committee and a large employer of labour, in reply to the Committee stated that as far as he knew there was no reason why the apprenticeship system should not be continued, or revived for handicrafts; but as these form now so small a portion of England's national industries, the point was hardly worth consideration. Mr. R. Cary Gilson, Headmaster of King Edward's High School, expressed the opinion that the abandonment of the apprenticeship system had done great mischief, which the institution of technical and continuation schools has not as yet done much to correct. Mr. Alfred Hayes, Principal of the Birmingham and Midland Institute, is of opinion that the substitution of machine work for handicraft, a minute and rigid sub-division of mechanical processes, the amalgamation of small into large manufactories, and these into huge syndicates, are tendencies which are inherent in modern industrial life, which cannot be resisted, and which will almost certainly increase from year to year. In the face of these tendencies, any serious attempt to revive the old system of apprenticeship is as certainly foredoomed to failure as would be the attempt to revive the stage-coach or the sailing ship. The only alleviation of the evil lies in the direction of the further shortening of the hours of labour, as should be possible with the increasing means of rapid production and transit, and the encouragement in every possible way of the humanizing influences, such as science, art, literature, and music, which, if they can be made to permeate the homes and lives of the workman, may serve as some compensation for the dehumanizing quality of his daily work. Mr. J. S. Taylor, another large employer, does not think the apprenticeship system can be successfully revived. In a few trades only, he says, is it possible to take apprentices now; owing to the large scale of production, the sub-division of labour has been carried to a minute degree, and automatic and semi-automatic machines are installed in most industries, the worker being now a specialist in the re-production of a few articles on machines devised for their rapid and economical productions; this method of working does not lend itself to the apprenticeship system.

The Bombay College of Commerce.

The following Press Note regarding the new College of Commerce has been issued by the Government of Bombay :—In Press Note No. 1578, dated the 24th June, 1912, it was announced that Government had received satisfactory promises of financial support towards the establishment of a College of Commerce in Bombay and that the details of a scheme would be worked out. Accordingly in July, 1912, definite proposals were made by the Government of India for the foundation of the proposed college and they were asked to obtain the sanction of the Secretary of State to the creation of two professorships to be recruited in England.

The Secretary of State has approved the proposals submitted by the Bombay Government as being a practical scheme well calculated to meet the demand which may be expected

to make itself felt in India for the services of trained actuaries and auditors, more especially in view of the recent legislation controlling Life Assurance Companies and Provident Societies. His Lordship has accordingly approved the proposals generally and has sanctioned the two professorships to be recruited in England.

The teaching staff which it is proposed to engage for the college at its commencement is as follows :—

Principal on £900 per annum or Rs. 1,125 per mensem.

Professor on £700 per annum or Rs. 875 per mensem.

Two lecturers on Rs. 300—25—500 per mensem each.

The two professors will be recruited in England for a specific term of service, and the two lectureships will be held by qualified Indians. The Secretary of State has now been requested to select a suitable candidate for the post of Principal who will join his appointment as soon as possible, so that his advice may be obtained in settling important details in connection with the opening of the college. The Lord Sydenham has kindly offered to assist, in England, in the selection of a candidate.

The college will be entirely under Government control, but, in order that the courses of study may be kept in full harmony with the practical requirements of commerce and industry, the Governor in Council proposes to appoint an advisory board in connection with the institution. This board will for the present consist of the undermentioned thirteen members representing respectively Government, the private donors, and the commercial bodies which have promised to contribute towards the cost of the college :—

(1) The Director of Public Instruction, Chairman of the Board.

(2) The Principal of the College.

(3) The second professor of the college.

(4) A representative nominated by Sir Jugmohandas Vurjeevandas.

(5) A representative nominated by the Trustees of the Wadia Charities.

(6) A representative nominated by Sir Chinubhai Madhavlal, Bart., C.I.E.

(7) and (8) Two representatives nominated by the Bombay Chamber of Commerce.

(9) A representative nominated by the Mill Owners' Association, Bombay.

(10) A representative nominated by the Indian Merchants' Chamber and Bureau.

(11) A representative nominated by the Bombay Native Piece-goods Merchants' Association.

(12) A representative nominated by the Mill Owners' Association, Ahmedabad.

(13) Sir James Begbie, Secretary and Treasurer of the Bank of Bombay.

The college will be affiliated to the University of Bombay, which has instituted a new degree of Bachelor of Commerce and framed a scheme of studies in connexion therewith.

In communicating his sanction to the scheme the Secretary of State has stated that he notes with pleasure the liberal support which has been promised towards the endowment of the College of Commerce on behalf both of private individuals and of commercial bodies.

Technical Education in Mysore.

We have received from the Government of Mysore a file of papers regarding Industrial and Technical Education in the State containing proposals and orders for their improvement. We hope to publish select portions in later issues. Meanwhile the following summary taken from the *Times of India* will be read with interest.

The Government of Mysore appointed a Committee in October 1910 with instructions to formulate a definite policy and plan of work for developing industrial education within the State. The Committee was asked to consider the subject in all its aspects and to submit a full and detailed report laying down a comprehensive programme with definite courses of training. The report of the committee was submitted to Government in September last and was signed by all the four members, including Mr. Visveswarayya, now Dewan of

the State. The Committee has examined the courses of study now provided in the seven Government industrial schools in the State, and has come to the conclusion that the weaving sections of these schools, in spite of the general defects of their organisation, have done good work by demonstrating to the public the advantages of the use of fly-shuttle looms. Cloths of finer counts unknown before are now produced. Silk and cotton are dyed locally in two centres to a certain extent, as the result of the teaching in these schools. Two other schools are doing excellent work and one of them, that in Mysore city, has developed in all directions. Two of the aided industrial schools in the State have also done creditable work. The Committee, however, is of opinion that, notwithstanding the good work that they are doing, the Government schools are not maintained in a proper state of efficiency and need to be reorganised. The proposals of the Committee comprise suggestions for the provision of institutions giving instruction in all the three grades of technical education, Higher, Secondary, and Primary. Higher technical education is needed to qualify students for the management of factories and other large industrial concerns. Secondary technical education is necessary for the training of mechanics, assistant foremen, and teachers for industrial schools. In addition to instruction in one or more trades, the men of this class, it is suggested, should have some general training in correspondence, commercial arithmetic, elementary mechanics, physics and chemistry. In the elementary courses, instruction would be given to the artisan classes and to people actually engaged in business and trades.

With these objects in view, the Committee suggests that a college of technology should be started in Bangalore to give instruction in higher engineering and the industrial arts. For secondary education, it proposes the establishment of a model school of technology in Mysore. The Committee suggests that the existing industrial schools in the State should be improved and developed, as far as circumstances permit, for the improvement of Elementary Industrial Education. The Committee has drawn up model curricula for all classes of institutions which may be started in the future and has given an approximate estimate of the cost of their maintenance. In places where the cost of starting such model institutions may be prohibitive, it recommends the opening of special morning or evening classes. The two large institutions to be established at Bangalore and Mysore will be entirely Government Institutions. The total annual cost of the college at Bangalore is estimated to be Rupees 75,000, while a capital outlay of Rs. 3 lakhs will be required for initial expenses. The technical institute in Mysore will involve a total capital expenditure of Rs. 50,000 and an annual recurring expenditure of about Rs. 73,000. The improvements in the existing industrial schools are expected to cost a net additional sum of Rs. 25,000 per annum. The Committee recommends the institution of two scholarships of £300 each to be granted annually from the State funds to students offering to study any one of a specified number of important industries. The selected students will be expected to study principally the practical and commercial details that may be of service to them in starting the industry in which they have qualified themselves on their return to the State. In addition to these two scholarships, the committee recommends that two local officers should be constantly placed on deputation in foreign countries, each for a period of not less than six months at a time. This recommendation is in view of the great importance which the committee attaches to the necessity of the State being in touch with the latest developments in arts and industries in other parts of the world. This arrangement will cost the State annually about Rs.30,000 for salaries, passage money and allowances. A special officer will be appointed to control industrial education on a salary of about Rs. 1,000 per month. It is wisely provided that no officer can be in charge of this department for more than three years at a time, unless he has special aptitude for the work, as evidenced by the results

achieved. The total cost of this scheme will be Rs. 5 lakhs in capital outlay and Rs 3 lakhs per annum for recurring expenditure.

Industrial and Technical Education in India.

The present position of Industrial and Technical Education and the future policy of the Government of India in regard to them are described in the following passage extracted from the Resolution of the Government of India on Education recently published. The Government of India say :—

No branch of Education at present evokes greater public interest than technical and industrial instruction. Considerable progress has been made since 1904. Existing educational institutions have been overhauled and equipped for new courses. Scholarships tenable in Europe and America have been established. Thanks to the generosity of the Tata family, seconded by liberal financial aid from the Government of India and His Highness the Maharaja of Mysore, an Indian Institute of Science designed upon a large scale has been established at Bangalore. It was thrown open to pupils in 1911. The establishment of a technological institute at Cawnpore for the chemistry of sugar manufacture and leather, for textiles and for acids and alkalis has been sanctioned. Industrial schools have been opened in several provinces. Altogether the number of technical and industrial schools has risen since 1904 from 88 to 218 and the number of pupils from 5,072 to 10,535.

The system of technical scholarships tenable abroad is still on trial and a committee is examining the whole question in England. It is not always easy to arrange suitable courses of study, and study abroad puts the pupils at a disadvantage in removing them from the environment of Indian trade conditions. From the information available it appears that of 73 scholars sent abroad, 35 have not returned to India, while 18 are at present industrially employed in India.

The policy to be pursued in regard to technical and industrial education was discussed at the Allahabad Conference. The Government of India accept the conclusions of that conference that progress should continue along the lines generally followed hitherto, *viz.*, that—

(1) The Indian Institute of Science which provides for research, the application of new processes and the production of thoroughly trained managers should be developed as opportunity offers and become eventually a complete faculty of pure and applied science.

(2) The larger provincial institutions, which attract students from different parts of India and afford instruction in practical methods of management and supervision, should in the first instance specialise along lines converging on local industries, a plan which will prevent overlapping and make for economy. Subsequently, as industries arise and the demand for managers and foremen increases other and more varied courses may be found necessary.

(3) The lesser industrial schools, minor weaving institutions, such of the schools of art as have an industrial bent, the art classes in Bengal and trade schools generally should be permanently directed towards such industries as exist in the localities where the institutions are situated.

The question has arisen as to how far educational institutions should develop on commercial lines. In certain cases instruction in industrial schools may be supplemented by practical training in workshops where the application of new processes needs to be demonstrated. In certain cases also it will be necessary to purchase and maintain experimental plant for demonstrating the advantages of new machinery or new processes and for ascertaining the data of production.

Quite recently, Lieutenant-Colonel E. H. de V. Atkinson, R.E., Principal of Thomson College, Roorkee, and Mr. T. S. Dawson, Principal of Victoria Jubilee Technical Institute, Bombay, were deputed to enquire how technical institutions can be brought into closer touch and more practical relations with the employers of labour in India. Their report contains many suggestions which are under consideration and emphasises the necessity of

studying the demand for technically trained men, of attracting Indian capital to industrial enterprise and of supplementing tuition at college by a period of apprenticeship. It also indicates that, while the field of employment or occupation in the highest grades is at present limited, the outlook for Indians is generalley hopeful, provided the necessity for preliminary practical training is fully realised.

There are four Government schools of art in India with some 1,300 pupils of which two are mainly industrial schools or schools of design. Interesting developments are the rise at the Calcutta institution of a new school of Indian painting which combines Indian treatment of subjects with western technique, and the foundation of an architectural branch in the institution at Bombay; but much remains to be done in connection with indigenous art industries. This matter requires careful expert consideration. The Government of India will address local governments on the subjects and for the present content themselves with advocating the importance and urgency of presenting in India, scientifically arranged collections of the products of its ancient and modern arts and crafts. The understanding and appreciation of Eastern Art work in Europe and America is draining good specimens in increasing value into the public collections of those continents.

Agricultural Education.

The present scheme of Agricultural Education originated under Lord Curzon's Government and is in fact only seven years old. Previous to the year 1905, there was no central institution for research or teaching and such education as was then imparted in agriculture was represented by two colleges and three schools in a more or less decadent condition. Very few Indians then had any knowledge of science in its application to agriculture and still fewer were capable or imparting such knowledge to others. In the year 1905, a comprehensive scheme was evolved under which arrangements were made both for the practical development of agriculture by Governmeut assistance and also for teaching and research in agriculture and subjects connected with it. A central institution for research and higher education was established at Pusa. The existing schools and colleges were reconstituted, improved and added to. Farms for experiments and demonstration were started and as time went on, a change was effected in regard to agricultural education in its earlier stages. As now constituted the scheme of agricultural education has three main features, *viz.*, (*a*) The provision of first class opportunities for the higher forms of teaching and research, (*b*) Collegiate education, and (*c*) The improvement of secondary and primary education.

The institute at Pusa, maintained at a cost of four lakhs a year, has 37 Europeans and Indians on its staff engaged partly in research, partly in post-graduate education and the instruction, through short courses, of students or agriculturists in subjects which are not regu larly treated in provincial institutions. There are now six provincial institutions containing over 300 students and costing annually between five and six lakhs of rupees. Practical classes for agriculturists have also been established at various centres in several provinces. In the ordinary elementary schools, formal agriculture is not taught, but in some provinces a markedly agricultural colour is given to the general scheme of education.

Veterinary research is carried on at the bacteriological laboratory at Muktesar. The scheme of veterinary colleges has been thoroughly re-organised since 1904. There are now four such institutions with 511 students as well as a school at Rangoon. These institutions meet fairly well the growing demand for trained veterinary assistants.

The Case for a College of Tropical Agriculture for Ceylon.

At a meeting of the Ceylon Board of Agriculture held in the Council Chamber, Colombo on February 3rd, 1913, and presided over by His Excellency the Officer administering the Government, a Committee was appointed to arouse public interest in the question of a College of Tropical Agriculture, and to point

out the advantages of Ceylon as a site for such a College. The following is the Report of the Committee.

THE CASE FOR A COLLEGE.

In order that there may be no confusion it is necessary to state clearly that the question involved is not whether a College of Tropical Agriculture is needed for Ceylon. On this question opinion may be divided, some constending that the young men of Ceylon would not take advantage of a College of Agriculture; others, that Planters would still prefer to train superintendents under the "creeper" system. While we hold that neither of these contentions carry serious weight, and that Ceylon, like the Dominions of the Empire, who take the greatest pride in their splendid Colleges, would quickly come to realize the advantages—the necessity— of sound and scientific training in Agriculture as in other professions, we do not intend here to take up this side of the argument, though we may quote the late Dr. Treub of Buitenzorg, Java, who said that "the formation of an Agricultural Department to include a College of Agriculture would create a role of great importance at Peradeniya of much use to agriculture in a colony where agriculture is the chief source of Revenue." The necessity of establishing a University or College of Tropical Agriculture has practically been accepted in England, but the site for such an Imperial College being, we believe, still undetermined, it is our endeavour to set forth in this Report the claims of Ceylon as being the most suitable place for the College. In this connection it may be stated, however, that a member of this Committee recently received a letter from an influential quarter at home, asking for information as to what decision the people of Ceylon had come to about a College of Agriculture. It is time, then, for the voice of Ceylon to be heard on this matter.

THE PROPOSED UNIVERSITY.

The London *Times* in its issue of January 24th last pleads for an University of Tropical Agriculture being established in the West Indies. In our view, comprehensive as the teaching should be, the subject does not specially demand an University. An University is generally understood to be an institution comprising many faculties, such as Arts, Law, Commerce, Medcine, Engineering; the needs of Tropical Agriculture could be met by a faculty of Tropical Agriculture in a University or by a College.

Nature follows the *Times* in favouring the West Indies as the place for a University or Imperial College, chiefly on the grounds that they are of easy access to the British Isles, affording professors and lecturers the opportunity of frequent personal intercourse with fellow-workers at home. In our judgment this is to misapprehend the character of tropical work. Tropical Agriculture can only be studied in the tropics, and those who come out and join its ranks are compelled to leave behind very much of what they have learnt at home.

In this respect Tropical Agriculture is on a somewhat different footing from medicine, engineering, law, commerce.

If, to quote *Nature*, the College should in the first place "be situated in a Colony offering the greatest possible scope for diverse agricultural pursuits," and, secondly, "the healthiness of the Colony should, as far as possible, be beyond reproach," then we contend there is no Colony in the Empire that can challenge the claims of Ceylon.

CEYLON ON THE OCEAN HIGHWAY.

Ceylon, situated in the very heart of our Tropical Empire, is on the ocean highway to the East Indies and to Australia, in close proximity to India, Assam and Burma, in touch with Mauritius and the Seychelles as well as with East Africa where great tropical planting industries, growing in dimensions yearly, are arising. Both British East Africa and Portuguese East Africa look to Ceylon, and have done for many years, for advice and assistance in matters concerning Tropical Agriculture; and this to a considerable extent is also the case with Australia. Ceylon trained planters are to be found in large numbers

in Malaya, the Straits Settlements, Assam, Southern India, and many of the Islands of Oceania, thus linking the Island with the tropical and sub-tropical world. It is manifest, assuming that an Imperial College of Agriculture is to be established, that the most convenient centre in the East is this Island.

THE TROPICAL PLANTING INDUSTRIES OF CEYLON.

In an issue such as that under consideration the interests of the student should govern the choice. We should not press the claims of Ceylon did we not feel that the interest of students could nowhere else be served as they would be here, because there is no othe country in the world, as far as we are aware, wherein so many planting industries can be seen thriving under prosperous commercial conditions and within so small an area. Within a radius of 75 miles of Peradeniya and at elevations ranging from sea-level to 6,800 feet there exist plantations of cocoanuts, tea, rubber, cocoa, cinnamon, citronella, tobacco, tropical fruits, spices and vegetable products, thriving industries of desiccated cocoanuts and cocoanut fibre and the manufacture of cocoanut oil. Sisal hemp and cotton are being taken up by the Department of Agriculture. Ours is essentially an Agricultural Colony having under cultivation nearly a million acres of cocoanuts, over half a million acres of tea, 186,000 acres of rubber, 47,000 acres of cinnamon, 43,000 acres of cocoa and 800,000 acres of other tropical products, such as—rice, citronella, tobacco, camphor, cardamoms, arecanuts, bananas, pineapples, sugarcane, cassava, fibres, etc. It has a large dry zone where Tropical Agriculture under irrigation is carried on.

In the high elevations sub-tropical products such as maize, wattle, lucerne will thrive, while the climate in certain localities is not unlikely to prove suitable for ostrich farming the Angora goat, sheep and cattle breeding.

The resources of Ceylon from an educational point of view are, we believe, unrivalled; so much so that the obligation does not so much lie with us to proclaim them as with other countries to show they have better.

PERADENIYA.

A recent writer fully qualified to express an opinion stated that he thought it paid a Botanist or an Agriculturist better to spend a month, or even two at Peradeniya and collect information and plants than to go round the whole tropical world for the same purpose. Professor Francis Ramaly wrote: "as a show place these gardens are not equalled anywhere in the world, and as a place of scientific interest to botanists there are few rivals."

Haeckel, the German Zoologist and Philosopher, said of his visit to Peradeniya, that in the four days which he spent there he learned more botany than he could have learned at home in as many months of hard study. Sir W. T. Thiselton Dyer called Peradeniya the "Kew of the East."

The Peradeniya Gardens are nearly one hundred years old and cover an area of 150 acres. They contain almost every economic product of importance known to the tropical world. The gardens with their trained staff of gardeners would provide for the Horticultural side of the College course. The Library contains some 6,000 volumes, and exchanges with or purchases all the important current agricultural and botanical publications. The Herbarium has 22,000 floral specimens; the Museum, 350 specimens of timber and 2,400 of economic products; the entomological laboratory, some 3,000 specimens; the mycological laboratory, 4,000 specimens. Across the river a site of 40 acres has been reserved on the Experiment Station for College Buildings. On this station, which covers 500 acres—cocoa, tea, rubber and cocoanuts are grown on plantation scale, while experiments are conducted on a smaller scale with a variety of other products.

Peradeniya is the headquarters of the Department of Agriculture with its staff of specialists. When in full working order the department will have eleven or twelve Experiment Stations and Botanic Gradens distributed over the Island; besides over 250 School

Gardens under its control, available in some cases as trial grounds.

These Experiment Stations are or will be conveniently situated near the railway, and will be accessible from Peradeniya by road or rail in one day.

To these attractions must be added that of climate. Peradeniya is at an elevation of between 1,600 and 1,700 feet with a mean temperature of 75° F. The nights are always cool, and even in the hottest months the days are not too oppressive for study.

One of the stations, Hakgala, to become a centre of sub-tropical development is at an elevation of 5,000 feet.

From the foregoing it will be obvious that the College would necessarily be situated at Peradeniya, already a centre of study, research and instruction. When the University of Ceylon comes to be established, as presumably it will in the course of time, the Peradeniya College would become one of the Colleges of the University, which would then grant Degrees in Agriculture. There would perhaps be three classes of students : those who had already gone through a scientific course of training in agriculture and wished to specialise in Tropical Agriculture; for this class a year at Peradeniya would be sufficient. A second class would comprise those who had taken a science course at school, and for these two years would be required. For those who had received no scientific training, three years would be necessary.

This scheme of a College of Tropical Agriculture is quite independent of the teaching of agriculture in village schools, preparation for which is already being made. School instruction of the *goiya* will go forward whatever happens to the College, but no doubt the two would come under one organisation, as there would be a certain amount of overlapping.

CONCLUSION.

The case for Ceylon as the site for an Imperial College of Agriculture is seen to be a strong one, but it would be greatly strengthened if the people of Ceylon showed their imperial spirit by raising a fund to go towards its endowment, and we urge this aspect of the question upon the public. The raising of a fund would be an earnest that the people of Ceylon believed in the splendid opportunities for agricultural education possessed by their island. With these possibilities it would indeed be disappointing if the College were to go to some other country less favoured, yet there might be a possibilty of this if the case of Ceylon were not sufficiently backed. We are but at the beginning of Tropical Agricultural development in the East ; with the enormous labour resources of India and China to draw upon, no limit can be set to its expansion. The young men of Ceylon will take part in this expansion not only in their own country but, equipped as they would be at a College, in other eastern countries also, for nothing would be so likely to overcome the prejudice against agriculture now felt among Ceylonese as a College that would elevate it into a profession. We therefore recommend that subscription lists should be opened for the raising of a fund to go towards the endowment of the College.

Leading men in Ceylon could found chairs or appoint that their donations be devoted to some specific purpose, in order that their names should become associated with the foundation.

A School of Co-operation at Liege.

In accordance with the division of the Co-operative Congress held at Jolimont, preparations are now in progress for a school of co-operation in the important industrial city of Liege ; and in view of the number of societies in the Province (eighty-three all told) the City of Liege must be regarded as an excellent centre for the experiment. The fact that Emile Vender Velde, the eminent politician and publicist, is to be one of the lecturers is sufficient to indicate the authoritative character of the instruction given. On the theoretical side, the lectures will cover the principles of co-operation, the utility of co-operative societies, the history of co-operation in Belgium and in other countries, co-operative organisation, distribution, production and exchange, both from the national and international standpoint ; co-operative education and the personnel of co-operative societies ; and co-operation, socialist and mutual; whilst on the practical side the lectures will range over commercial law, co-operative legislation, mercantile courses, organisation of buying and selling, the control of commodities and other important topics.

INSURANCE.

What is Life Insurance.

Originally, it was a system invented in England in 1696, to insure human life, just as a postal parcel or a marine vessel, to be indemnified only in case of loss. But now in its present 'Endowment' form, it is the most wonderful invention of the nineteenth century, being, in itself, the most ingenious and beautiful combination of the two most important factors of human life, *viz*, (1) Profitable Investment and (2) Immediate Protection.

1. Investment.—Serving the purpose of a pleasant and profitable accumulation of one's earnings and savings that would otherwise be frittered alway in useless or unnecessary items of expenditure, without, at the same time, any unpleasant or undue interference with the ordinary and current expenses of every-day life.

2. Protection.—Immediately protecting the bread-winner's dear ones against all the unexpected emergencies of his valuable life.

The aforesaid harmonious combination of 'Investment' and 'Protection' in Life Insurance is based upon the most exact scientific principles of mathematical calculations, *viz.*, (1) Law of Human Mortality, and (2) Principles of Compound Interest.

(1) Law of Human Mortality—Even in our death rate, there is the Divine Law of Uniformity. From the statistics of about 200 years, it has been discovered that there is an approximate uniformity in the death-rate of human beings, the rate increasing with the increase of age. For instance, amongst 1,000 healthy male Indians aged thirty the death-rate is about nine a year, while among 1,000, aged fifty, the rate is about twenty-two. This is why premiums increase with age.

(2) Compound Interest.—It is because the rate of mortality is practically uniform, that an Insurance Co. knows how many of its policy-holders will die in any particular year, and with this fore-knowledge as to its liabilities, it can safely make long investments and re-investments and earn compound interest thereon. Every Insurance Co. assumes, *i.e.*, supposes, to earn a certain rate of interest, while periodically (every three or five years) calculating its assets and liabilities. This calculation made by an Actuary (*i.e.*, a Master of Insurance, regularly trained and recognized by the Government of England or America) is called an *Actuarial valuation.*

Tips for Agents.

1.—Don't waste your time chasing people who have no money?

2.—Don't waste time trying to insure young men just out of college; they all feel that they will live a hundred years.

3.—Don't do all the talking, give your prospect a chance, and keep in mind the fact that you never can sell a man anything unless he will talk to you.

4.—It is easier to insure a father than a single man.

5.—It is easier to insure the man who understands life, and who has attended a few funerals.

6.—When the prominent man of a small community dies, then is the time for you to get busy in that community.

7.—When a man dies, do not forget sympathy and courtesy; let his family alone during their bereavement, but get busy with the "house next door" and all the families on the same street.

8.—The easiest man to insure is the man of 40; you do not have to convince him that "life is short."

9.—Always go to the doctor with your client, never leave him to go alone, because the average man is a poor hero when it comes to a medical examination.

10.—Remember that the great crime of life is—old age without a shilling.

11.—Keep your eye on the clock. Every day gone by never returns. Make the most of each day.

12.—Insure your own life, and protect those that depend on you, and you will be a much better preacher.

13.—Hit the man's heart; not until then will the pen act on the dotted line. Figures will never soften his heart. Buying a life income to protect his wife will soften it; what the necessary deposit may be is a secondary consideration.—*New York Life Bulletin.*

MACHINERY, SCIENCE AND INVENTION.

Milk Ice Blocks to Cool Milk.

An unusual method of preparing milk for long-distance shipping has been adopted in the Brazilian Province Minas Geraes, from which Rio de Janeiro draws most of its milk supply. Part of the fresh pasteurised milk (one-fourth to one-third) is frozen into solid cubes, weighing from 20 to 30 lbs. each, and a number of them are placed in cans, having insulated walls and holding about 300 quarts. The cans are then filled with milk, hermetically closed, and the whole cooled to 39 deg. F. It is said that milk shipped after such treatment will stand a journey of 15 to 20 days without injurious effect, and that, while the frozen milk, of course, slowly melts and mixes with the rest, the consistency of the milk upon arrival is perfectly homogeneous, and in no way to be distinguished from the fresh product.

Japanese "Culture" Pearls.

The British Commercial Attache at Yokohama reports that considerable export business is done with Europe and America in Japanese "culture" pearls, which, although in appearance and nature are the same as the natural oyster pearl, are obtained from oysters by a special process at the Mikimoto pearl-culture farm in the Bay of Ago, a small bay inside the Gulf of Ise. The "culture" pearl has to be cut off from the shell, whereas the natural pearl is found free in the oyster; consequently, in the case of the former, one part of the pearl is inferior in appearance, and this accounts for the large difference in value between natural and "culture" pearls.

Governing of Oil Engines.

The governing of oil engines is a point of particular importance and is often put forward as an objection to their adoption by steam engine makers. There are two principal methods, the one known as the "hit-and-miss," whereby a working stroke of the engine is entirely cut out, and the other by means of which the supply of fuel is regulated to suit the load, and no working strokes are missed. Other methods consist in prematurely opening the exhaust valve or keeping it closed but these are hardly in general use. On light loads, according to the *Engineer*, the hit-and-miss principle has the advantage in fuel consumption, the mixture being kept constant at all loads, whereas with the graduated charge the mixture may vary and also the amount of compression. Water injection is now generally used and is found not only to increase the efficiency of the engine but to allow the compression to be carried to a higher point without increasing the risk of pre-ignition.

An Oscillating Hand-loom.

An ingenious hand-loom has recently been patented in England which is considered by many of those who have examined it to be just the thing for India. It is described as being of such simple construction that even a comparatively weak man could work it for a whole day without undue exhaustion. It is designed to weave loin cloths 24 inches wide and to produce material at the rate of 30 yards per day of nine hours. A few business men in Manchester are forming a company to work the patent. The concern is to be known as the Anglo-Indian Oscillating Loom and Warp Supply Company. The patentee has evidently not placed a very inflated value upon his invention as he is going to be content with £150 in cash (for all his rights in five countries) together with £250 in shares. He will, however, expect some further remuneration when the company has been successfully floated, but not until 7½ per cent. is paid on the capital invested.

Although the company about to be formed is to be, in the first instance, a small one, the promoters believe that the looms will achieve instant success in the Indian market. They are said to be cheaper than anything of the kind yet supplied and will be a great boon to those in India who still prefer to work the hand loom.

A well known member of parliament interested in India has been asked to accept the chairmanship of the Board, and another member (Sir Philip Mangus), sitting on the opposite side of the House has brought the invention to the notice of the Secretary of State for India.

HEALTH AND HYGIENE.

Food Values.

Dr. Seebohm Rowntree has made a study of the people of York, as a result of which he says: "I found that while 58·45 per cent. of the total food expenditure was for animal food, this only provided 30·3 per cent. of the protein of the dietary, and 33·36 per cent. of the total energy value. On the other hand, the 35 per cent. of total food expenditure devoted to vegetable foods yielded 60·45 per cent. of the total protein, and 66·48 per cent. of the total energy value represented by the diet.

Alum for Scorpion Stings.

Alum is a sovereign remedy in cases of scorpion sting, says a correspondent to the *Madras Mail.* "During my stay at Saidapet some years ago, my wife was stung on one of her toes by a large red scorpion. She suffered severe pain, perspiring profusely, rolling on the floor and groaning piteously. A little alum was dissolved in water, in the absence of lime-juice, which would have been far more efficacious, to the consistency of a paste, and with this the toe was well coated and a piece of live charcoal held close to the toe until the paste was quite dry. As the process of drying proceeded the pain decreased, until in a few minutes the latter altogether disappeared."

An Investigation of Soap.

The effects of various soaps upon the skin has been examined by Dr. Frederick Gardiner, who issues his results in the *Edinburgh Medical Journal.* Chemical, bacteriological, and clinical tests were employed, including some experiments upon himself which can hardly have been pleasant. All soaps, he finds, must be from their chemical composition irritant to the normal skin; the effect varies with the individual, and is greater in senile and diseased skins. Cotton seed oil and rancid fats are nowadays much used in the manufacture of cheap soaps and probably account for their irritant effects. The bacteriological power of soap is *nil;* and this applies not only to ordinary soaps, but also to those impregnated with disinfectants or antiseptics. Sulphur, ichthyol, and similar substances may have some effects upon the glands and blood vessels of the skin, but carbolic and other antiseptics merely increase irritation. There is no scientific basis, Dr. Gardiner says, for the addition of extra fat to soap; the only virtue in a superfatted soap is that the higher price at which it is sold generally means that the makers can afford to use very pure materials. Rosin is less detrimental than is generally supposed as an ingredient of soap.

Walking as an Exercise.

Walking, if properly and regularly followed, says *Health*, would become not only a restorer of health to many who at the present time are on the road to disease, but also a source of pleasure. Let the arms swing if you feel like it, and the limbs too; open the nostrils and fill the lungs and the movements will send a gentle electric vibration through the entire body, the result of which is the awakening of new life. Never take the lazy gait, as it soon makes one tired, and produces languor. Perhaps the best time to walk is in the early morning. The air is then most highly charged with the life-giving oxygen, and free from the dust and smoke which rise later in the day. At this time, also, the mind is liable to be free from worry and anxiety, hence in the best condition to drink in the blessing of freshness for us on every hand.

Diagnosis of Disease made Easy.

At a recent meeting of a Medical Congress in Berlin, Dr. Rosanthal presented for inspection a new apparatus invented by himself, by means of which it is possible to cinematograph any internal organ of the body, thus enabling a view of its actual working to be seen, and in case of illness aiding in the location of the exact centre of the disease. The Congress was allowed to see the internal working of a stomach, and the medical men present were at once able to detect the presence of disease. The invention, which is an adaptation of the X-rays, is very simple, and it is declared that it will revolutionise the system of diagnosis. There will no longer be any need for doctors to operate, to discover the nature and location of disease. The apparatus makes all disease visible.

HINTS AND RECIPES.

Cleaning Copper Plate Engravings.

Wash the sheet on the front and back sides by means of a soft sponge or brush with water, to every 1,000 parts of which 40 parts of carbonate of ammonia have been added, and rinse the sheet off with water. Then moisten it with water, to which a little wine-vinegar has been added, rinse again with water, in which a little chloride of lime has been dissolved, and dry in the air, preferably in the sun. The sheet will be perfectly clear, without injury to the print.—*Neueste Erfindungen und Erfahrungen.*

Coating Iron and Steel with Zinc.

An improved process for coating iron and steel with zinc by electro-deposition has been developed by a firm of manufacturers in Birmingham, who are now in a position to supply the necessary apparatus and materials to those who think of adopting this method of galvanising. The process is similar to that employed in other plating processes, *e.g.*, in electro-brassing. The articles are first pickled and scoured and then placed in a suitable electrolytic-action. The improvement now effected relates to the composition of the electrolyte, which is said to ensure a brighter, more regular, and firmer deposit than has hitherto been obtainable. It is stated that with a moderate amperage a deposit sufficient for all ordinary purposes may be made in a quarter of an hour, while in half an hour sufficient zinc is deposited to protect the article from oxidation even when exposed to the full effects of the weather in an acid atmosphere. The new process is applicable to such diverse manufactures as iron and steel tubes and fittings, castings, wire, staples, nails, screws, nuts and bolts, window casements, iron and steel sheets, etc. It is claimed that the process is more economical than the hot method, because the deposits being perfectly even all over instead of being deposited in blobs here and there, a given weight of zinc is made to go further.

Kind Treatment of Cows.

An interesting experiment was recently performed at the Kansas Agricultural College to determine the relative results of kind and unkind treatment upon cows, says the *Queensland Agricultural Journal.* Three cows were treated kindly, and were found to give an average of 36 lb. of milk, with 4·3 per cent. of butter fat. Later, these same cows were frightened by jumping at them, howling at them and striking them while they were eating. It was found at milking that they produced only 23 lb. of milk containing 3·4 per cent. of butter fat. Three other cows tested gave 31 lb. of milk, containing 4·2 per cent. of butter fat under kind treatment. They were driven into a field and the dogs were allowed to bark at them and chase them. As a result they averaged only 23 lb. of milk with 3·6 per cent. of butter fat. It should not be necessary to point the moral.

Indelible Inks for Glass and Metal.

The production of Indelible inks for glass and metal may be effected according to the following recipes in *Pharmaceutische Zeitung*: Black: soda, water-glass 1 to 2 parts, fluid India ink 1 part. White: soda, water-glass 3 to 4 parts, Chinese white or permanent white (sulphate of baryta) 1 part. The bottles containing these inks must be closed air-tight, and, before use, well shaken. Steel pens are used for writing. After use the pens must be thoroughly cleansed. The writing is not affected by any reagent used in microscopy, but can easily be erased with the penknife. For writing on glass a mixture of shellac solution and washed chalk has proved very satisfactory (coating with varnish is unnecessary). As the chalk may previously be mixed with any desired color, colored glass inks may in this manner be produced. If the glass has been perfectly cleansed, by means of alcohol or ether, writing can be accomplished very nicely with such glass inks by means of a pen or brush.